

**SECTION 11 12 00**  
**PARKING CONTROL EQUIPMENT**

**PART 1 GENERAL:**

**1.1 DESCRIPTION:**

- A. Section Includes:
  - 1. Automatic Barrier Gates.
  - 2. Vehicle Detectors.
  - 3. Card Control Units.

**1.2 RELATED WORK:**

- A. Asphaltic paving: Section 32 12 16, ASPHALT PAVING.
- B. Concrete paving: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.
- C. Concrete foundation work: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- D. Color and texture: Section 09 06 00, SCHEDULE FOR FINISHES.
- E. Conduit placement for equipment: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS, Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS and Section 28 05 33, RACEWAYS AND BOXES FOR ELECTRONIC SAFETY AND SECURITY.
- F. Power supply to disconnect, junction box, in gate arm unit: Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW), Section 27 15 00, COMMUNICATIONS HORIZONTAL CABLING.
- G. Electrical characteristics and wiring connections: Section 26 27 26, WIRING DEVICES.
- H. Work by Government:
  - 1. Card Access System.
  - 2. Coded cards.

**1.3 QUALITY CONTROL:**

- A. Qualifications:
  - 1. Approval by Contracting Officer is required of products or service of proposed manufacturer, suppliers, and installers, and will be based upon submission by Contractor of certification that:
    - a. Installer: Approved by manufacturer of materials and has technical qualifications, experience, trained personnel and facilities to install specified items.
    - b. Manufacturer's product submitted has been in satisfactory operation, on three installations similar and equivalent in size to this project, for three years. Submit list of installations.

2. Maintenance Proximity: Installer shall maintain a place of business with maintenance facilities not more than two (2) hours normal travel time from project site.
3. UL and NEMA Compliance: Provide internal electrical components required as part of parking control equipment that are listed by UL and comply with applicable NEMA standards.
4. Single-Source Responsibility: Obtain parking control equipment from one source and from a single manufacturer.

**1.4 SUBMITTALS:**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, submit following:
  1. Manufacturer's Literature and Data:
    - a. Description of parking control equipment material and accessories to be provided.
    - b. Provide data on operating equipment, characteristics and limitations, and operating temperature ranges.
  2. Samples:
    - a. Submit two samples of access cards and security program, illustrating size, and coding method.
  3. Shop Drawings and Certificates: Indicate plan layout of equipment access lanes, mounting bolt dimensions, conduit and outlet locations, power requirements, and conformation of building electrical requirements. Provide Contractor with mounting bolt template in time for installation.
  4. Wiring Diagrams: Detailing wiring for parking control equipment operator, signal, and control systems differentiating clearly between manufacturer-installed wiring and field-installed wiring.
    - a. Show locations of connections to electrical service provided as a unit of work under other Divisions.
  5. Maintenance Data: For parking control equipment components for inclusion in Operating and Maintenance Manuals, include the following:
    - a. Maintenance Instructions: Provide manufacturer's instructions for maintenance of parking control equipment.
      - 1) Include recommended methods and frequency for maintaining equipment in optimum operating condition under anticipated traffic and use conditions.

- 2) Include precautions against materials and methods that may be detrimental to finishes and performance.
- 3) Lubrication Schedule and Information: Provide lubrication and periodic maintenance requirement schedules including parts list and parts numbers.
- 6. Operation Data: Provide operating data for operating equipment, including clock timer, changing security access code, and any other pertinent information required for Government operation.
- 7. Certificates: Quality Control Certificate Submittals and lists specified in paragraph, QUALIFICATIONS.
- B. In accordance with Section 00 72 00, GENERAL CONDITIONS, submit following at project closeout: Warranty.
- C. In accordance with Section 01 00 00, GENERAL REQUIREMENTS, submit following at project closeout: Warranty.
  - 1. Project Record Documents: Record actual locations of concealed conduit and vehicle detection activators.

**1.5 REGULATORY REQUIREMENTS:**

- A. Products Requiring Electrical Connection: Listed and classified by UL testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

**1.6 PROJECT CONDITIONS:**

- A. Coordinate placement of conduit, accessories, and power wiring to operating equipment.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

**1.7 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver materials to site in original sealed packages or containers; labeled for identification with manufacturer's name and brand.
- B. Store materials in weathertight and dry storage facility. Protect from damage due to handling, weather, and construction operations before, during and after installation.

**1.8 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing Materials (ASTM):

A153/A153M-05.....Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

A500 (Rev A)-03.....Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

A653/A653M-07.....Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

C. National Electrical Manufacturers Association (NEMA):

MG 1-06.....Motors and Generators.

D. National Fire Protection Association (NFPA):

70-07.....National Electrical Code.

E. Underwriters Laboratories Inc. (UL):

Electrical Appliance and Utilization Equipment Directory.

#### **1.9 SYSTEM DESCRIPTION:**

A. Parking Control System: Automatic operation at entrance and automatic operation at exit.

B. Design: Protect against interference or damage by lightning or other electrical influence; include fuse, over-voltage protection, flash-over protection, and line filter.

C. Entry - Automatic Gate Arm Control: Electrically operated upon insertion of coded card. Activate automatic arm reversing switch if an obstacle is sensed in downward motion.

D. Exit - Automatic Gate Arm Control: Electrically operated upon detection of vehicle by sensing loop buried in pavement. Activate automatic arm reversing switch if an obstacle is sensed in the downward motion.

#### **1.10 SCHEDULING:**

A. Name Street Gate: Automatic key card operation, single gate arm, single gate exit arm activated with loop detector in pavement, and heated cabinets.

B. Employee Gate: Automatic key card operation, single gate arm, single gate exit arm activated with loop detector in pavement, and heated cabinets.

#### **1.11 WARRANTY**

A. Submit manufacturer's written warranty for materials and installation in accordance with FAR clause 52.246-21.

1. Warranty: Cover keeping equipment operational.

2. Final Acceptance: Requirement for final acceptance shall be continued acceptable use of parking control equipment without a breakdown or stoppage for a period of fifteen (15) calendar days after final acceptance of project by Government.

**PART 2 PRODUCTS****2.1 PARKING CONTROL EQUIPMENT**

- A. Parking Products, Inc. (Basis-For Design Guide)  
2517 Wyandotte Road  
Willow Grove, PA 19090  
(215) 657-7500
- B. American Parking Equipment Inc.  
535 Oxford Street  
Etobicoke, Toronto, Ontario M8Y 1E5  
(800) 565-4666.
- C. Amano Parking Systems  
140 Harrison Avenue  
Roseland, NJ 07068  
(800) 367-6649
- D. Delta Scientific Corporation  
24901 West Avenue Stanford  
Valencia, CA 91335  
(800) 521-9330
- E. Federal APD  
24700 Crestview Court  
Farmington Hills, MI 48335  
(800) 521-9330
- F. Magnetic Automation Corporation  
1715 Independence Blvd., Suite. B-7  
Sarasota, FL 34234  
(941) 351-7116

**2.2 MATERIALS:**

- A. Iron and Steel Hardware: ASTM A153; Zinc coating (hot-dip) on iron and steel hardware.
- B. Steel: ASTM A653/A653M; Galvanized to G90 Z275.
- C. Structural tubing in rounds and shapes: A500; Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- D. Aluminum:
  - 1. Sheet: ASTM B 209M (ASTM B209).
  - 2. Extruded Shapes: ASTM B 221 M (ASTM B221).

**2.3 UNIVERSAL GATE UG-141 (EMPLOYEE GATE):**

- A. Housing: The housing shall be weather proof and constructed of heavy gauge steel not less than #14. All seams, joints and supports shall be electric bead weld. Spot welds are not acceptable for housing

construction. Access to the motor compartment shall be provided by a removable top cover secured by latches located inside the housing. Access to the interior of the housing shall be provided by a full length gasketed key locked door. The door and top shall be designed to retard unauthorized entry, tampering and vandalism. An opening of 6 inches by 12 inches shall be provided at the bottom of the housing for conduits and field wiring. The gate shall be painted in a powder coat finish applied over a suitable primer.

- B. Control Circuitry: All control circuitry, etc. shall be contained in one easily removable sealed housing hereinafter referred to as the gate controller. All electrical connections to the gate controller shall be made with pluggable terminal blocks. One standard gate controller shall be capable of providing all system logic as well as manual functions. The gate controller shall provide inputs for connection of any peripheral equipment such as loop detectors, ticket machines, card readers, etc. The operating mode of the gate shall be determined by routing the control wires of these devices to their proper inputs. No re-programming of the gate controller shall be necessary. A manual UP/DOWN switch shall be provided.
- C. Gear Motor: The gate arm drive assembly shall be directly gear driven by a gear motor. No belt, pulley, or chain drive shall be acceptable. The 1/3 H.P. motor shall conform to NEHA standards. The motor shall be instantly reversible electrically via bi-directional solid state AC switches driven by solid state trigger circuits located inside the gate controller. No mechanical stops, breaks, clutches, etc., shall be acceptable. Vertical and horizontal gate arm stopping positions shall be controlled by independently adjustable micro-switches. The micro-switch assembly shall be located on the gear motor. Provisions shall be made for easy field adjustment. It shall be possible to open the gate manually by means of a hand crank in case of power failure.
- D. Gate Arm: Gate arm length shall be a maximum of 12 feet. The gate arm shall be clamped to the unit by means of a screw on bracket in order to provide a break-away feature. Remounting of gate arms shall not require the drilling of holes.
- E. Options:
1. An articulating gate arm shall be provided for installations with limited overhead clearance. The gate arm shall be two wooden pieces

- driven and firmly supported by metal side brackets and a single adjustable steel rod. Wood side brackets shall not be acceptable.
2. A gate arm rebound feature shall be provided in-case an object is struck by the gate arm. If the gate arm comes into contact with an object during the closing cycle, sufficient non-destructive pressure shall cause the gate motor to instantly reverse and return the gate arm to the full open position. Pressure applied to the gate arm while in the full closed position shall not activate the motor to raise the arm. The rebound sensor shall be a part of the gate arm drive shaft contained within the locked gate housing. Positive electrical contact of this feature shall be provided to prevent recycling. A timer can be incorporated in the gate circuitry to automatically lower the gate arm after a rebound activation providing the closing loop is not occupied by a vehicle.
  3. A heater controlled by a thermostat shall be provided for installations operating in cold climates.

## F. Technical Data:

1. Housing:	Weatherproof #14 Ga. Steel construction, flush, tamper proof full length door, removable hood for easy access off the ground, rust resistant feet, powder coat finish.
2. Motor Drive:	1/3 HP heavy duty motor direct drive.
3. Gate Arm:	Wooden arm up to 12 ft. (3.5m) PVC or aluminum arms optional
4. Control Circuitry	Sealed, self-contained plug-in controller.
5. Power:	110VAC, 60 Hz, 10 Amps (220VAC, 50 Hz, 6Amps optional)
6. Environmental:	Operating temperature: -5°F to 160° (-20° to 70°C)
7. Mechanical	46" H x 18" W x 12" D (1168mm x 457 mm x 305 mm)
8. Weight	170 lbs. (77 Kg)

**2.4 POWER GATE PG-541 (ENTRANCE TO L07 7-18'-0") :**

## A. Housing:

1. The housing shall be weather proof and constructed of heavy gauge steel not less than #14. All seams, joints and supports shall be electric bead welded. Spot welds are not acceptable for housing construction.

2. Access to the motor compartment shall be provided by a removable top cover secured by latches located inside the housing. Access to the interior of the housing shall be provided by a key locked door. The door and top shall be designed to retard unauthorized entry, tampering and vandalism. An opening 6 inches by 12 inches shall be provided at the bottom of the housing for conduits and field wiring.
3. The finish shall consist of a powder coat finish applied over a suitable primer.

B. Control Circuitry:

1. All control circuitry, logic, motor starting circuitry, etc., shall be contained in one easily removable sealed housing hereinafter referred to as the gate controller. All connections to the controller shall be made through easily accessible screw terminals.
2. One standard controller shall be capable of providing all system logic as well as manual functions.
3. Operational mode changes shall be accomplished by jumpers on a termination panel. No circuitry changes, modifications, additions or deletions shall be required to accomplish these mode changes.
4. The gate controller shall contain a magnetic type circuit breaker for overload protection. Thermal type overload circuit breakers will not be acceptable as these devices change in characteristic according to changes in ambient temperature. A switch shall be provided for manual up/down control.

C. Gate Arm Drive Assembly:

1. The gate arm drive assembly shall be directly linked to the gear motor assembly by a heavy duty connecting rod. The gate arm shaft shall be moved in harmonic motion. The gate arm travel shall not exceed 5 seconds for raising or lowering. Override stops shall be provided to positively limit the gate arm travel in either the vertical or horizontal position.
2. The gate arm stopping positions shall be independently adjustable via micro-switches. The micro switch assembly shall be located on the larger sprocket drive shaft and provisions must be made for easy field adjustment.

- D. Gate Arm: The gate arm assembly shall consist of a hollow aluminum assembly up to 20 feet in length. The gate arm shall be counter



balanced by weights which can be added to the opposite side of the gate arm bracket assembly.

E. Technical Data:

1. Housing:	Weather proof, #14 Ga steel construction flush, tamper proof full length door, removable hood for easy access off the ground, rust resistant feet, powder coat finish
2. Motor Drive:	1/3 HP heavy duty motor Direct drive
3. Gate Arm:	Aluminum, up to 20 feet.
4. Control Circuitry:	Self contained, sealed, plug-in controller
5. Environmental:	Operating temperature: 0 deg. F to 110 deg. F (-20 deg. C to 45 deg. C)
6. Mechanical:	46" H x 18 1/4 W x 12 1/4" D (1170mm x 460mm x 310mm)
7. Weight:	300 lbs. (156 Kg)

## 2.5 ELECTRICAL CHARACTERISTICS AND COMPONENTS:

A. Electrical Characteristics:

1. Provide 1/3 hp rated load amperes.
2. Provide 110 volts AC, single phase, 60 Hz.
3. Provide 10 amperes maximum circuit breaker size overcurrent protection.
4. Refer to Section 26 27 26, WIRING DEVICES: Electrical connections.

## 2.6 CARD CONTROL:

- A. General: Provide pedestal mounted card control units to activate barrier gates.
- B. Control Unit: To activate gate arm by insertion of coded card RSA certified.
- C. Cabinet: 1.9 mm (0.075 inch) minimum welded cold-rolled steel sheet, weather tight seams; thermally insulated to permit heater to maintain cabinet temperature to equipment operating minimum, flush access doors and panels, tamper proof flush mounted lock hardware and two (2) keys master keyed to operate access panel, weather tight gaskets. Conceal mounting bolts inside units.
1. Mount housing on a 50 mm (2 inch) square steel tube pedestal with a curved top to receive housing, and a trim plate to cover anchor bolts.

2. Finish interior and exterior of cabinet with manufacturer's standard baked enamel finish over primer. Color as indicated in Section 09 06 00, SCHEDULE FOR FINISHES.

D. Card Slot: Mount 35-1/2 inches above vehicle pavement surface, illuminate and protect with projecting weather shield.

E. Coded Cards: Provided by Government.

## 2.7 CARD CONTROLLER MCO-630:

### A. Card Reader:

1. The card reader shall be a magnetic device capable of reading areas of discreet magnetic influence electronically coded in a plastic card. The reader shall require no external source of power.
2. A minimum of 10,000 period or code changes shall be possible without changing the reader. Code changes shall be accomplished by changing code plates or matrix cards in the reader.
3. Insertion of a card with the correct code into the reader shall cause a contact closure. Cards without the proper code will have no effect on the reader.
4. The card reader housing shall be a weather proof enclosure of #14 ga. aluminum with a lockable front plate. The enclosure shall be suitable for wall or pedestal mounting.

### B. Contract I. D. Card:

1. The contract I. D. card shall be a heavy duty plastic card 3-3/8 inches x 2-1/8 inches with a barium ferrite core.
2. The card shall be capable of being magnetically encoded to operate the series MCO-630 reader. The construction of the card shall permit recoding, thereby eliminating the need for purchasing new sets of cards each time the system code is changed.
3. Include custom imprinting and I.D. pictures to the cards.

### C. Technical Data:

1. Power:	Magnetic, now power required.
2. Output:	Normally open contact.
3. Dimensions:	8-1/2" W x 8" D x 5" H (215 mm x 203 mm x 127 mm)
4. Weight:	3 lbs. (1.3 Kg)
5. Environmental:	Operating temperature: -5 deg. F to 160 deg. F (-20 deg. C to 70 deg. C)
6. RSE certified	
7. Housing:	Match parking gate housing.
8. Intercom CVA printed out and installed shall be included with this system.	

**2.8 VEHICLE DETECTION:**

- A. Vehicle Detection: For use in temperature range of -40 to 71 °C; (-40 to 160 °F) to consist of detector unit in conjunction with sensing loop to activate card control barrier gate when vehicle enters or exits.
- B. Loop Wire: 14 gage, XHWN or THWN copper; loop size of 1 200 X 1 800 mm. (48 X 72 inches.)
- C. Loop Groove Fill: Same material as pavement. Hot poured asphalt.

**2.9 FINISHES:**

- A. Gate Arm: Two coat enamel with reflective yellow and white diagonal stripes on both sides of arm.
- B. Gate Posts and Cabinets: Baked enamel on steel.

**PART 3 - EXECUTION****3.1 EXAMINATION:**

- A. Verification of existing conditions before starting work:
  - 1. Prior to beginning installation, examine areas to receive parking control equipment. Verify that critical dimensions are correct and that conditions are acceptable:
    - a. Do not proceed with installation of parking control equipment until unsatisfactory conditions have been corrected.
- B. Verify that anchor bolts are ready to receive work and dimensions are as indicated on shop drawings and instructed by manufacturer.
- C. Verify that electric power is available and of correct characteristics.

**3.2 PREPARATION**

- A. Provide templates for anchor bolts and other items encased in concrete or below finished surfaces in sufficient time so as not to delay work.

**3.3 INSTALLATION**

- A. Install parking control system and components in accordance with manufacturer's instructions and placement drawings.
- B. Cut grooves in pavement surface, install vehicle detection loops and lead-in wires, and fill grooves with loop filler.
- C. Install internal electrical wiring, conduit, junction boxes, transformers, circuit breakers, and auxiliary components required.

**3.4 ADJUSTING**

- A. Prior to final acceptance of project adjust system components for smooth operation.
- B. Fit and adjust hardware for ease of operation.

1. Lubricate hardware and other moving parts.
2. Readjust parking control system and components at completion of project.

### **3.5 CLEANING**

- A. Clean metal surfaces promptly after installation, exercising care to avoid damage to coatings. Touch up damaged shop-applied finishes as required to restore damaged areas.
- B. Follow recommendations of manufacturer in selection of cleaning agents. Do not use cleaning agents containing ammonia or other compounds that might damage finished metal surfaces.

### **3.6 FIELD QUALITY CONTROL**

- A. Tests:
  1. Test operating functions in accordance with manufacturer's printed checklist.
  2. Correct defects revealed by tests. Retest corrected areas until functions are operating properly.

### **3.7 DEMONSTRATION, TESTING AND ACCEPTANCE**

- A. Instruct Government's personal in proper operation and maintenance of parking control equipment. Train personnel in procedures to follow in event of operational failures or malfunctions.
- B. Acceptance: At completion of project, and as a condition of acceptance, parking control equipment and systems shall be operated for a period of 15 consecutive calendar days without breakdown.

### **3.8 PROTECTION:**

- A. Protect parking control equipment finished surfaces from damage during erection, and after completion of work until final inspection and acceptance.

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**SECTION 11 52 20**  
**FLAT SCREEN TV MOUNTING BRACKETS**

**PART 1 GENERAL:**

**1.1 DESCRIPTION:**

- A. Section Includes:
1. Flat screen TV mounting brackets.

**1.2 RELATED WORK:**

- A. Work by Government:
1. Television and Television installation.

**1.3 SUBMITTALS:**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, submit following:
1. Manufacturer's Literature and Data.
  2. Shop Drawings: Indicate layout of Flat screen TV mounting brackets, mounting bolt dimensions, conduit and outlet locations, power requirements, and conformation of building electrical requirements. Provide Contractor with mounting bolt template in time for installation.

**1.4 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver materials to site in original sealed packages or containers; labeled for identification with manufacturer's name and brand.
- B. Store materials in weathertight and dry storage facility. Protect from damage due to handling, weather, and construction operations before, during and after installation.

**PART 2 PRODUCTS**

**2.1 MANUFACTURER**

- A. Premier Mounts (Basis-For Design Guide) or approved equivalent.

**2.2 MATERIALS AND FABRICATION:**

- A. Model Number: P2642F.
- B. Display Size: 660 to 1066 mm (26 to 42 inches). Nominal outside dimensions of 539 mm (21.21 inches) width by 432 mm (17.01 inches) height.
- C. Depth From Wall: 24mm (0.96 inches).
- D. Mounting Pattern: Up to 535 by 400 mm (21 by 15 inches).
- E. Maximum Display weight 56 kgs. (130 pounds).
- F. Color: Black.

G. Features:

1. Rigid reinforced wall plate design.
2. 406 and to 457 mm (16 and 18 inch) center mounting slots.
3. Post-mounting display leveling system.
4. Cable and power box access.
5. Safety screws to prevent flat-panel removal.
6. Universal hardware pack with universal spacers.
7. Complete fastener assembly packet for steel stud, concrete and wood substrates.

**PART 3 EXECUTION**

**3.1 EXAMINATION:**

- A. Verification of existing conditions before starting work. Prior to beginning installation, examine areas to receive Flat screen TV mounting brackets. Verify that critical dimensions are correct and that conditions are acceptable. Do not proceed with installation of equipment until unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Provide templates for fasteners in sufficient time so as not to delay work.

**3.3 INSTALLATION**

- A. Install Flat screen TV mounting brackets in accordance with manufacturer's instructions and placement drawings.

**3.4 ADJUSTING**

- A. Prior to final acceptance of project adjust Flat screen TV mounting brackets for smooth operation.

- - - END - - -

**SECTION 12 24 00**  
**WINDOW SHADES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Electrically operated sunscreen roller shades.
- B. Local group and master control system for shade operation with addressable encoded motors.
- C. Whole Building Shade Management System: Automated Solar Tracking Control System Computer Shade Control System.
- D. Window shades shall be furnished complete, including brackets, fittings and hardware.

**1.2 RELATED WORK**

- A. Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS for additional LEED requirements.
- B. Section 01 81 19, INDOOR AIR QUALITY REQUIREMENTS for VOC limit.
- C. Section 06 10 00, ROUGH CARPENTRY for wood blocking and grounds for mounting roller shades and accessories.
- D. Section 09 29 00, GYPSUM BOARD for coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.
- E. Section 09 51 00, ACOUSTICAL CEILINGS for coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.
- F. Division 26 - Electrical for electric service for motor controls
- G. Color of shade cloth and color of exposed parts of window shades: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 QUALITY CONTROL**

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience and minimum of three projects of similar scope and size in manufacturing products comparable to those specified in this section.
- B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
- C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- D. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system.

Individual testing of components will not be acceptable in lieu of system testing

- E. Anti-Microbial Characteristics: "No Growth" per ASTM G21 results for fungi ATCC9642, ATCC9644, ATCC9645.
- F. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified below. Initial submittals, which do not include the Environmental Certification, below will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.
- G. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.
- H. Recycling Characteristics: Provide documentation that the shade cloth can and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material, without down cycling. Certify that this process is currently underway and will be utilized for this project.
- I. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.
- J. Mock-Up: Provide a mock-up, if Professional requires, of one roller shade assembly for evaluation of mounting, appearance and accessories.
  - 1. Locate mock-up in window designated by Professional.
  - 2. Do not proceed with remaining work until, mock-up is accepted by Professional.



**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
  - 3. Storage and handling requirements and recommendations.
  - 4. Mounting details and installation methods.
  - 5. Typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.
- C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
  - 1. Prepare shop drawings on AutoCAD or Microstation format using base sheets provided electronically by the Professional.
- D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- E. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.
- F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shade cloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
- G. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls
- H. LEED Submittals:
  - 1. Credits MR 4.1 & 4.2: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
    - a. Include statement indicating costs for each product containing recycled content.
  - 2. Credits MR 5.1 & 5.2: For products manufactured within 500 miles of project site and whose raw materials are extracted, harvested or recovered, within 500 miles of the project site, documentation indicating the location and distance of material manufacturer and

point of extraction, harvest, or recovery for each raw material from the Project site.

- a. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced to in the text by the basic designation only.
- B. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- C. NFPA 70 - National Electrical Code.
- D. UL325 or Equal - Listed Solution covering all controls, electrical accessories and motors.
- E. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings.

#### **1.7 PROJECT CONDITIONS**

- A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

#### **1.8 WARRANTY**

- A. Motorized Roller Shade Hardware and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five-year warranty.
- C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed Government's responsibility.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURER**

- A. Basis-of-Design: MechoShade Systems, Inc; (718) 729-2020; or approved equivalent.
- B. LEED Requirements:
  1. Recycled Content of Steel Products: Provide steel products with minimum 25% post-consumer recycled content

**2.2 SHADE CLOTH**

- A. Environmentally Certified Shadecloth: MechoShade Systems, Inc., EcoVeil Naturals group, 8050 Series, fabricated from TPO for both core yarn and jacket, single thickness, non-raveling 0.762 mm (0.030 inch) thick fabric.
1. Weave: 1-2% percent open 2x2 jacquard weave.
  2. Warranty: 10-Year Limited.
- B. Room darkening (PVC Free) Shadecloth with opaque acrylic backing: MechoShade Systems, Inc., "Equinox 0100 series", 0.19 mm (0.008 inches) thick blackout material and weighing .94 lbs. per square yard, comprising of 53% fiberglass, 45% acrylic, 2% poly finish.

**2.3 SHADE BAND**

- A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
1. Concealed Hembar: Shall be continuous extruded aluminum for entire width of shade band and with the following characteristics:
    - a. Hembar shall be heat sealed on all sides.
    - b. Open ends shall not be accepted.
  2. Shade band and Shade Roller Attachment:
    - a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection.
    - b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
    - c. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
    - d. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

**2.4 ROLLER SHADE FABRICATION**

- A. Roller Shade Schedule:
1. Shade Type WT-1: Motorized interior solar roller shades in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.
  2. Shade Type WT-2: Motorized interior independently operated solar and blackout shade double shades in all exterior windows of rooms and

spaces shown on Drawings, and related motor control systems. (Exam Room and Conference Rooms).

- a. WT-2 type shades shall have capability of being controlled by both Solar Tracking Control System as well as AV or Lighting System.
- B. Include motorized shades with group controls and interfacing to either BMS, AV or Lighting Control Systems.
1. Roller Shade Hardware, shade fabric, motor, and all related controls shall be furnished and installed as a complete assembly.
  2. All electrical and electronic controls and accessories required for a complete control system including appropriate interface to communicate with stand alone BMS, Day Lighting, AV, or central integration contractor, shall be provided as part of the contractor based proposal as separate line items listing the control / interface components provided. Equipment shall include, but not be limited to motor controllers, dry contact closures, RS-232, or RS-485 interface units, transformers, relays, and interface units.
  3. Contractor shall list all components included in their bid and shall be financially responsible for any change orders and/or back charges required by the BMS, AV, or Lighting Control Systems contractors to interface with the motorized roller shade system.
- C. Fabricate shade cloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shade cloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
1. Concealed hem tube.
- D. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shade bands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shade cloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.
- E. For railroaded shade bands, provide seams in railroaded multi-width shade bands as required to meet size requirements and in accordance with seam alignment. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure

proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.

- F. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.
- G. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 115 mm (3 feet) on center extending fully into the side channels. Battens shall be concealed in an integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.
  - 1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.

## **2.5 COMPONENTS**

### **A. Access and Materials Requirements:**

- 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
- 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
- 3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

### **B. Motorized Shade Hardware and Shade Brackets:**

- 1. Provide shade hardware constructed of minimum 3.18 mm (1/8-inch) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade. Plastic components without use of steel angle construction do not meet the intent of this specification and shall not be accepted.
- 2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
- 3. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor (multi-banded shade, subject to manufacturer's design criteria).

4. All bands within a single motor group shall be aligned within 1/4 inch.

## **2.6 INTELLIGENT ENCODED SHADE MOTOR DRIVE SYSTEM**

### **A. Shade Motors:**

1. Intelligent Encoded Motor & Control System: Tubular, asynchronous (non-synchronous) motors, with built-in reversible capacitor operating at 110v AC (60hz), single phase, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.
2. Conceal motors inside shade roller tube.
3. Maximum current draw for each shade motor of 2.3 amps.
4. Use motors rated at the same nominal speed for all shades in the same room.

### **B. Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of the shade motor and tube assembly.**

### **C. Intelligent Encoded Motor System (Software, two-way communication): Specifications and design are based on the Intelligent Motor Control System / I\*CON™ Motor System) as manufactured by MechoShade Systems, Inc. Other systems may be acceptable providing all of the following performance capabilities are provided. Motor control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.**

1. Upper and lower stopping points (operating limits) of shadeband's shall be programmed into motors via a hand held removable program module / configurator.
2. Intermediate stopping positions for shades shall be a minimum of 4-predefined intermediate positions, for a total of 6-defined and aligned positions. All shades on the same switch circuit with the same opening height shall align at each intermediate stopping position.
3. Encoded Motors shall be addressable via a hand-held removable program module and shall be capable of responding to a minimum of seven different user defined stored addresses including multiple overlapping sub groups and three reserved control input addresses for use by building management systems, life safety systems and other emergency inputs.
4. The system shall have the capability of two-way communication with the motors. Each motor shall allow for a unique address message to

- be received from the hand held configurator and/or a PC controller or switch.
- a. Bus line shall consist of 2-twisted pair of 16-gage low voltage wire.
  - b. Shade motor control components (bus interfaces, wall switches, bus supplies, auxiliary control input devices, and similar items) shall be connected in series via the low voltage (12VDC) two way digital communication bus line.
  - c. Bus line shall be capable of being installed in a free topology to provide maximum flexibility for installation and future maintenance.
  - d. Low voltage (12VDC), digital bus line shall be powered by a bus supply transformer, requiring 115VAC (220 - 230 VAC) input drawing a maximum current of 1 amp. A minimum of one bus supply shall be required for every 120 meters (400 linear feet) of bus line. Final bus supply spacing shall be reviewed with the system manufacturer after the number of nodes per 120 meters (400 linear feet) run of bus line has been determined.
5. Wall Switches:
- a. Conference Rooms and Exam Rooms: Shades shall be operated by a 4 & 8 button low voltage standard switches or programmable intelligent switches [IS]. Standard switch shall be wired to a bus interface and the bus interface will be programmed to transmit an address for the local switch.
  - b. Intelligent switches may be installed anywhere on the busline. Each IS shall be capable of storing one control level address to be broadcast along the busline.
  - c. An address that is transmitted by either a switch or central controller shall be responded to by those motors with the same address in their control table.
  - d. IS shall provide for interface with other low voltage input devices via a set of dry contact terminals located on the switch.
  - e. Standard switch or IS may control an individual, sub-group or group of motors in accordance with the address in each motor.
6. Touch Screen Manual Override: Provide one Color LCD Touch Screen panel per floor of designated motorized shades at locations indicated on Drawings. The touch screen shall be enabled by the touch of a finger and a map of the shades by the shade motor for the local area on that floor shall be brought up onto the screen. Each shade motor when touched shall provide a drop down menu showing preset positions.

When a preset is selected, that shade motor shall move that shade to the manually selected preset position.

## **2.7 AUTOMATED DAYLIGHTING SOLAR TRACKING SHADE CONTROL SYSTEM**

### **A. Solar Tracking Control System: Automated Computer Shade Control System**

(SolarTrac-SunDialer™ Four Zone Controller as manufactured by MechoShade Systems, Inc., Long Island City, NY):

1. Control System shall adjust the shade position to maximize energy management, view and personal comfort based on micro-climactic conditions.
2. The goal is to maximize view without Thermal or Visual discomfort through:
  - a. Thermal Comfort as assured by Solar Tracking.
  - b. Visual Comfort as assured by managing (on the window wall).
3. Control system shall be capable of optimizing the position of the shades (incrementally), to continuously deploy the shades in response to changes in Proactive and Reactive requirements:
  - a. Control Modules:
    - 1) Solar Tracking SunDialer Module: Base Control System:
      - (a) Thermal Comfort:
        - (1) Proactive Algorithms (Primary):
          - (i) Sun angle.
          - (ii) Solar intensity - Total Light Spectrum.
          - (iii) BTU Load.
        - (2) Reactive Algorithms:
          - (i) Real-Time Sky Conditions via (2) Roof Mounted Radiometers.
4. Incremental Positioning:
  - a. Shades shall be capable of being aligned at up to 256 Positions.
  - b. The Control System shall be capable of staggering the operation of shade motors to assure balanced loading of the electrical system.
5. Continuous Operation:
  - a. 24 hours per day, 7 days per week, 365-1/4 days per year.
  - b. Shade positioning resolution shall be calculated every 60 seconds.

### **B. Graphical User Interface (GUI)**

1. Configuration Screens:
  - a. PC-GUI shall provide access to all adjustable parameters displaying current values including but not limited to:
    - 1) Radiation.
    - 2) Shade position.
    - 3) User defined requirements.



- b. Displays Real-Time Microclimatic Sky Conditions (Option available).
  - c. Reports / Analysis Accessible from MechoShade Systems via Engineering Monitoring):
    - 1) Data Storage: (Available as a SunDialer Option via IP Access at varying levels.)
      - (a) Event Log: Continual record of each day's activities including shade position and shade mode changes.
        - (1) Store on a change of state basis.
        - (2) Archived based on user defined file size.
    - 2) Sensor Data: Daily Record of sensor's data stored into a history file on a 60 second basis:
      - (a) Stored on a repetitive basis.
        - (1) Roof mounted radiometers.
    - 3) Control Zone timeline Visual Record of Current Day's Activity by Zone:
      - (a) Reporting by Zone of current day operation by intermediate stop locations.
    - 4) Trending Reports:
      - (a) Daily Report - Sky, Sensors, Event Log, Timeline
      - (b) Shade Position Report - % of time shade at each position.
      - (c) Override Report - Reason for Override, % of day overridden up / down.
    - 5) Interface with other Report Writers:
      - (a) Event Log and Sensor Data available in native MBD format.
      - (b) Available in SQL format.
- C. OVERRIDE:
- 1. Control Software shall incorporate an Override Event Scheduler such the building owner may customize position of shades by motor, group, zone or whole building for any event, night or weekend requirements.
  - 2. Manual Override:
    - a. Wall Switches.
    - b. Touch Screens.
    - c. Virtual Shade Control Switch (via IP).
  - 3. Master Override:
    - a. SolarTrac SunDialer™ control system shall have capability of whole building control for master override by zone or by motor.
  - 4. Remote Off-Site-Monitoring:
    - a. IP Interface for both monitoring, maintenance and software upgrades.
    - b. Provide Maintenance, Support and licensing contract.

**2.8 ACCESSORIES**

- A. Roller Shade Pocket 4124 for recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings for Shade Type WT-1.
- B. Roller Shade Pocket 5113 for recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings for Shade Type WT-2.
  - 1. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
    - a. Provide "Vented Pocket" such that there will be a minimum of four 1 inch (25.4 mm) diameter holes per foot allowing the solar gain to flow above the ceiling line..

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

**3.3 ROLLER SHADE INSTALLATION**

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow clearances for window operation hardware.
- B. Turn-Key Single-Source Responsibility for Motorized Interior Roller Shades: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:

1. Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings.
  2. Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
  3. Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
  4. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.
  5. Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.
- C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- D. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

### **3.4 ADJUSTING**

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

### **3.5 CLEANING AND PROTECTION**

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Resident Engineer, before time of Substantial Completion.

### **3.6 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Government's maintenance personnel to adjust, operate, and maintain roller shades.

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**SECTION 13 34 29**  
**PREFABRICATED GUARD BOOTH**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section covers materials, labor and equipment required to complete the prefabricated guard booth shown and specified.
- B. System Description: Prefabricated Guard Booth shall be a single unit of welded steel construction and to be shipped completely assembled.

**1.2 RELATED WORK**

- A. A. Section 01 81 13: SUSTAINABLE DESIGN REQUIREMENTS. Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS for additional LEED requirements.
- B. Section 01 81 19, INDOOR AIR QUALITY REQUIREMENTS for VOC limit.
- C. Color of prefabricated guard booth: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Concrete curbs and foundations: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- E. Electrical, Division 26, ELECTRICAL.

**1.3 MANUFACTURERS QUALIFICATIONS**

- A. Approval by Contracting Officer is required of products or service of proposed manufacturer, suppliers and installers, and will be based upon submission by Contractor of certification that:
- B. Manufacturer regularly and presently manufactures prefabricated guard booths as specified as one of its principal products.
- C. Installer has technical qualifications, experience, trained personnel and facilities to install specified items. Approval will not be given, however, where experience record is one of unsatisfactory performance.
- D. Manufacturer's product submitted has been in satisfactory and efficient operation on three installations similar and equivalent to this project for three years. Submit list of installations.

**1.4 DESIGN CRITERIA**

- A. The drawings indicate sizes, profiles, and dimensional requirements of the pre-engineered metal building system. Metal building systems having equal performance characteristics with deviation from indicated dimensions and profiles may be considered, provided deviations do not change the design concept or intended performance. The burden of proof for equality is on the proposer.
- B. SYSTEM PERFORMANCE REQUIREMENTS:

1. General: Engineer, design, fabricate and erect the prefabricated guard booth to withstand loads from winds, gravity, structural movement including movement thermally induced, and to resist in-service use conditions that the building will experience, including exposure to the weather, without failure.
  - a. Design each member to withstand stresses resulting from combinations of loads that produce the maximum allowable stresses in that member as prescribed in MBMA Design Practices Manual.
2. Design Loads: Basic design loads, as well as auxiliary and collateral loads.
3. Basic design loads include live load, wind load, and seismic load, in addition to the dead load.
4. Regulatory Requirements: Conform to IBC 2006.
5. Factory installed electrical devices shall be UL listed and conform to the National Electric Code.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Product Data: consisting of prefabricated guard booth manufacturer's product information for building components and accessories.
- C. Shop drawings for prefabricated guard booth shall include elevations, sections, floor plan, and anchor clip detail, system components and accessories.
- D. LEED Submittals:
  1. Credits MR 4.1 & 4.2: For products having recycled content, documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
    - a. Include statement indicating costs for each product containing recycled content.
  2. Credits MR 5.1 & 5.2: For products manufactured within 500 miles of project site and whose raw materials are extracted, harvested or recovered, within 500 miles of the project site, documentation indicating the location and distance of material manufacturer and point of extraction, harvest, or recovery for each raw material from the Project site.
    - a. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

## **1.6 STORAGE AND PROTECTION**

- A. Deliver prefabricated guard booth as a single unit so it will not be damaged or deformed.
- B. Handling: Exercise care in unloading, storing and erecting unit to prevent bending, warping, twisting, and surface damage.

## **1.7 WARRANTY**

- A. Prefabricated guard booths shall be warranty against defects in materials and workmanship, and that after erection completed work shall be weather tight and shall be subject to the terms of the "Warranty of Construction" Article in Section 00 72 00, GENERAL CONDITIONS, except that the warranty period shall be two years.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS:**

- A. Manufacturers offering products, subject to compliance herewith which may be incorporated in the Work include, but are not necessarily limited to the following:
  - 1. Porta-King Building Systems (Basis for Design Guide)  
4133 Shoreline Drive  
Earth City, MO 63045  
T: 800-284-5346  
F: 1-314-291-2857  
W: [www.portaking.com](http://www.portaking.com)
  - 2. PAR-CUT International, Inc.  
40961 Production Drive  
Harrison Township, MI 48045  
T: 1-800-394-6599  
F: 586-463-6059  
W: [www.parkut.com](http://www.parkut.com)  
E: [sales@parkut.com](mailto:sales@parkut.com)
  - 3. B.I.G. Enterprises, Inc.  
9702 East Rush Street  
South El Monte, CA 91733-1730  
T: 1-800-669-1449  
F: 626-448-3598  
W: [www.bigbooth.com](http://www.bigbooth.com)  
E: [info@bigbooth.com](mailto:info@bigbooth.com)
  - 4. CID Associates, Inc.  
730 Keaston Road (Route 228)

Sarver, PA 16055

T: 724-353-0300

F: 724-353-0308

W: [www.cidbldgs.com](http://www.cidbldgs.com)

E: [sales@cidbldgs.com](mailto:sales@cidbldgs.com)

5. Little Buildings, Inc.

161 Shafer Drive

Romeo, MI 48065-4913

T: 810-752-7100

F: 810-752-7108

W: <http://home.msen.com>

E: [little@home.msen.com](mailto:little@home.msen.com)

**2.2 MATERIALS**

- A. Recycled Content of Steel Products: Provide steel products with minimum 25% post-consumer recycled content.

**2.3 COMPONENTS**

- A. MODEL NO.: DURASTEEL MODEL DA 75SL

- B. Product Construction:

1. Building shall be of welded steel construction with all intersecting welded connections ground smooth. Overall height to be as indicated on Drawings.
2. Structural corners and uprights to be 2" x 2" x .120 structural ASTM A500 Grade B welded tubing.

- C. Wall and Ceiling Panels:

1. Wall panels shall be 14 gauge galvanized steel on exterior and 16 gauge galvanized steel on interior.
2. Overall wall thickness shall be 2".
3. Ceiling to be 14 gauge galvanized steel, painted to match total building.
4. Provide R-10 wall insulation and R-19 ceiling insulation.

- D. Finish:

1. Exterior surfaces of steel walls and corners shall be full flush, smooth, and unbroken by visible seams or caulked joints (any visible seam is not acceptable).
2. Interior wall surfaces shall be flush, smooth welded construction with no exposed fasteners.

3. Interior and exterior surfaces shall be electrostatically painted with rust inhibitive epoxy primer and shall have a finish coat of air-dry industrial acrylic paint.
4. Building to be painted one color, as selected from acrylic finishes.
5. Provide brick finish from windowsill down.

E. Floor Structure:

1. Floor structure to be an integral part of the building with 1-1/2 inch solid waterproofing insulating core fit tight against panels and fastened to bottom structural base frame.
2. Finished floor shall be 3003 Treadbrite safety treadplate floor covering.

F. Doors:

1. Doors to be of anodized aluminum, 1-3/4 inch tubular construction and half-glazed.
2. Bottom portion to include panel finish to match interior and exterior building walls.
3. Sliding door to be ceiling suspended in overhead track assembly and shall be fully weather-stripped. Sliding doors shall incorporate a maximum-security laminated hook bolt deadlock with removable cylinders.

G. Windows and Glazing:

1. Windows shall have anodized aluminum frames and inserts and to be industrial quality with active window panel to slide horizontally on stainless steel, ball-bearing rollers (plastic rollers are not acceptable).
2. Windows to include inside positive locking device.
3. Exterior window sill height to be 38 inches (inside sill height 34 inches from finished floor).
4. Windows to be glazed with 3/16 inch clear tempered safety glass.

H. Counter:

1. Furnish 22" deep, full width stainless steel counter, per plans, 32" above finished floor.
2. Provide a steel storage drawer with lock.

I. Electrical:

1. Electrical service to include single phase, 100 amp capacity load center, pre-wired in conduit, with one 230v circuit and four 115v circuit capacity.
2. Provide two spare circuits.



3. Conduits to be recessed in walls and electrical boxes and fixtures surface mounted.
  4. All electric work shall be in compliance with the National Electrical Code.
  5. All electrical components shall bear the UL label.
  6. Furnish one 115v duplex outlet, and one 230v single outlet.
  7. Lights to be fluorescent type fixture with acrylic lens and wall switch.
  8. One Thru-Wall HVAC unit, 230V, 9,900C/11,600H BTU.
  9. One additional 115v duplex outlets.
  10. Two empty conduit runs with pull wire to run communication lines.
- J. Exterior Roof:
1. Provide an expanded metal pitched roof measuring 24 inches tall constructed of 3/4 inch by #9 flat expanded metal material with 5 inch overhang and 6" high metal fascia.
  2. Kynar/Hylar roof finish with manufacturer's standard color selection.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine areas and conditions with installer present.
- B. Examine location of primary electrical service prior to building installation.

**3.2 INSTALLATION**

- A. Install Prefabricated Guard Booth on flat, level, properly cured concrete slab.
- B. Install in accordance with the manufacturer's written instructions and placement drawings.

**3.3 ADJUSTING**

- A. Verify unit is anchored and level.

**3.4 CLEANING**

- A. Leave unit in clean, ready-to-use condition acceptable to Architect.

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SECTION 14 21 00

ELECTRIC TRACTION ELEVATORS

TABLE OF CONTENTS

PART 1	GENERAL .....	1
1.1	WORK INCLUDED .....	1
1.2	RELATED WORK PROVIDED UNDER OTHER SECTIONS .....	1
1.3	DEFINITIONS .....	4
1.4	QUALITY ASSURANCE .....	4
1.5	DOCUMENT VERIFICATION.....	5
1.6	SUBMITTALS.....	5
1.7	PERMIT, TEST AND INSPECTION.....	6
1.8	MAINTENANCE .....	6
PART 2	PRODUCTS.....	7
2.1	SUMMARY .....	7
2.2	MATERIALS.....	11
2.3	CAR PERFORMANCE.....	12
2.4	OPERATION.....	13
2.5	MACHINE ROOM EQUIPMENT.....	17
2.6	HOISTWAY EQUIPMENT .....	20
2.7	HOISTWAY ENTRANCES .....	22
2.8	CAR EQUIPMENT .....	23
2.9	CAR ENCLOSURE .....	27
2.10	HALL CONTROL STATIONS.....	29
2.11	SIGNALS .....	29
2.12	GROUP CONTROL AND DISPLAY PANEL.....	31
PART 3	EXECUTION.....	32
3.1	SITE CONDITION INSPECTION.....	32
3.2	PRODUCT DELIVERY, STORAGE, AND HANDLING.....	32
3.3	INSTALLATION .....	32
3.4	FIELD QUALITY CONTROL.....	33
3.5	ADJUSTMENTS .....	33
3.6	CLEANUP .....	33
3.7	ACCEPTANCE REVIEW AND TESTS.....	33
3.8	GOVERNMENT' S INFORMATION .....	35

**SECTION 14 21 00**  
**ELECTRIC TRACTION ELEVATORS**

**PART 1 GENERAL**

**1.1 WORK INCLUDED**

- A. FOUR (4) traction elevator(s) as follows:
  - 1. TWO (2) Geared Passenger Elevator(s). Car(s) 1 & 2
  - 2. TWO (2) Geared Passenger/Service Elevator(s). Car(s) 3 & 4
- B. All engineering, equipment, labor, and permits required to satisfactorily complete elevator installation required by Contract Documents.
- C. Additional equipment or finishes furnished under other sections, installed under this section:
  - 1. CCTV system
  - 2. Card reader security system

**1.2 RELATED WORK PROVIDED UNDER OTHER SECTIONS**

- A. Hoistway and Pit:
  - 1. Clear, plumb, substantially flush hoistway with variations not to exceed 1" at any point.
  - 2. Bevel cants not less than 75° from the horizontal on any rear or side wall ledges and beams that project or recess 4" or more into the hoistway. Not required on hoistway divider beams.
  - 3. Divider beams between adjacent elevators at each floor, pit, and overhead. Supports at each floor for car and counterweight guide rail fastening. Intermediate car guide rail support when floor heights exceed 14'-0" or as designated on contract drawings. Intermediate counterweight guide rail supports where floor heights exceed 16'-0". Building supports not to deflect in excess of 1/8" under normal conditions.
  - 4. Installation of guide rail bracket supports in concrete. Inserts or embeds, if used, will be furnished under this Section.
  - 5. Wall blockouts and fire rated closure for control and signal fixture boxes which penetrate walls.
  - 6. Cutting and patching walls and floors.
  - 7. Structural slab, concrete wall pockets and/or structural steel beams for support of hoist machine, rope sheaves, and dead-end hitch beams. Support deflection shall not exceed 1/1666 of span under static load. Concrete or structural steel machine hold down means

for hoist machine mounted offset from hoistway or below bottom landing.

8. Erect front hoistway wall after elevator entrances are installed.
9. Grout floor up to hoistway sills and around hoistway entrances.
10. Lockable, self-closing, fire-rated pit door.
11. Pit access ladder for each elevator.
12. Structural support at pit floor for buffer impact loads, guide rail loads.
13. Waterproof pit. Indirect waste drain or sump with flush grate and pump.
14. Protect open hoistways and entrances during construction per OSHA Regulations.
15. Protect car enclosure, hoistway entrance assemblies, and special metal finishes from damage.
16. Hoistway venting.
17. Hoistway lighting and machine room switch.
18. Seal fireproofing to prevent flaking.
19. Access ladders and platform to governor(s).
20. Partition between machine room and hoistway where hoist machine is mounted offset from hoistway.
21. Paint walls and ceiling.

B. Machine Room and Machinery Spaces:

1. Enclosure with access. Provide ships ladder or stair with guard railing. Include similar access to overhead machinery space.
2. Self-closing and locking access door.
3. Ventilation and heating. Maintain minimum temperature of 55° F, maximum 90° F. Maintain maximum 80% relative humidity, non-condensing.
4. Paint walls and ceiling.
5. Class "ABC" fire extinguisher in each elevator machine room.
6. Seal fireproofing to prevent flaking.
7. Fire sprinklers where required.
8. Overhead floor grating for access to overhead machinery space.

C. Electrical Service, Conductors, and Devices:

1. Lighting and GFCI convenience outlets in pit, machine room, and overhead machinery spaces. Provide one additional non-GFCI convenience outlet in pit for sump pump.

2. Three-phase mainline copper power feeder with true earthen grounding to terminals of each elevator controller in the machine room with protected, lockable "open" disconnecting means. Auxiliary disconnects in multi-level machine room.
3. Single-phase copper power feeder to each elevator controller for car lighting and exhaust blower with individual protected, lockable "open" disconnecting means located in machine room.
4. Emergency telephone line to each individual elevator control panel in elevator machine room.
5. Fire alarm initiating devices in each elevator lobby for each group of elevators or single elevator and each machine room to initiate firefighters' return feature. Device at top of hoistway if sprinklered. Provide alarm initiating signal wiring from hoistway or machine room connection point to elevator controller terminals. Device in machine room and at top of hoistway to provide signal for general alarm and discrete signal for Phase II firefighters' operation.
6. Temporary power and illumination to install, test, and adjust elevator equipment.
7. Means to automatically disconnect power to affected elevator drive unit and controller prior to activation of machine room fire sprinkler system and/or hoistway fire sprinkler system. Manual shut-off means shall be located outside bounds of machine room.
8. When sprinklers are provided in the hoistway all electrical equipment located less than 4'-0" above the pit floor shall be identified for use in wet locations.
9. Single-phase power feeders to machine room elevator for hoistway lighting and toggle switch.
10. Single-phase power feeders to machine room elevator monitoring panel/display unit with single-phase, protected, lockable "open" disconnecting means.
11. Single-phase power feeders to controller(s) for CCTV with lockable "open" disconnecting means.

D. Emergency Power Provision:

1. Emergency power of normal voltage characteristics via normal electrical feeders to run one elevator at a time in each elevator group at full-contract car speed and capacity.

2. Conductor from auxiliary form "C" dry contacts, located in the Emergency power transfer switch to a designated elevator control panel in each elevator group. Provide a time delay of 30 - 45 seconds for pre-transfer signal in either direction.
3. Emergency single-phase power to group controller, and each elevator controller for car lighting, exhaust blower, emergency signaling device, hoist machine cooling fan.
4. Means for absorbing regenerated power during an overhauling load condition per NEC 620.91.
5. Emergency power to machine room, pit, and overhead machinery space lighting.
6. Emergency power to machine room ventilation or air conditioning.
7. Emergency power to emergency communications device(s).

E. Cab Finishes:

1. Section 09 06 00, Schedule for Finishes.

### **1.3 DEFINITIONS**

- A. Terms used are defined in the latest edition of the Safety Code for Elevators and Escalators, ASME A17.1.
- B. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.
- C. Provisions of this specification are applicable to all elevators unless identified otherwise.

### **1.4 QUALITY ASSURANCE**

- A. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of following codes, laws, and/or authorities, including revisions and changes in effect:
  1. Safety Code for Elevators and Escalators, ASME A17.1
  2. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2
  3. Elevator and Escalator Electrical Equipment, ASME A17.5
  4. National Electrical Code, NFPA 70
  5. Americans with Disabilities Act, ADA
  6. Local Fire Authority
  7. Requirements of UBC, BOCA, SBC, IBC, OSHPD, DSA, and all other codes, ordinances and laws applicable within the governing jurisdiction
  8. Life Safety Code, NFPA 101

9. Uniform Federal Accessibility Standard, UFAS

10. VA Vertical Transportation Guidelines

B. Warranty:

1. Material and workmanship of installation shall comply in every respect with Contract Documents. Correct defective material or workmanship which develops within one year from date of final acceptance of all work to satisfaction of Resident Engineer at no additional cost, unless due to ordinary wear and tear or improper use or care by Government. Perform maintenance in accordance with terms and conditions indicated in the Preventive Maintenance Agreement.
2. Defective is defined to include, but not limited to; operation or control system failures, car performance below required minimum, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unsatisfactory conditions.
3. Make modifications, requirements, adjustments, and improvements to meet performance requirements in Parts 2 and 3.

**1.5 DOCUMENT VERIFICATION**

- A. In order to discover and resolve conflicts or lack of definition which might create problems, Contractor must review Contract Documents for compatibility with its product prior to submittal of quotation. Government will not pay for change to structural, mechanical, electrical, or other systems required to accommodate Contractor's equipment.

**1.6 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, Shop Drawings, Product Data and Samples.
- B. Within 45 calendar days after award of contract and before beginning equipment fabrication submit shop drawings and required materials for review as outlined in Division I. Allow 10 calendar days for response to initial submittal.
1. Scaled or Fully Dimensioned Layout: Plan of pit, hoistway, and machine room indicating equipment arrangement, elevation section of hoistway, details of car enclosures, hoistway entrances, and car/hall signal fixtures.

2. Design Information: Indicate equipment lists, reactions, and design information on layouts.
3. Power Confirmation Information: Include motor horsepower, code letter, starting current, full-load running current, and demand factor.
4. Fixtures: Cuts, samples, or shop drawings.
5. Finish Material: Submit 3" x 12" samples of actual finished material for Resident Engineer review of color, pattern, and texture. Compliance with other requirements is the exclusive responsibility of the Contractor. Include, if requested, signal fixtures, lights, graphics, Braille plates, and details of mounting provisions.

- C. Acknowledge and/or respond to review comments within 10 calendar days of return. Promptly incorporate required changes due to inaccurate data or incomplete definition so that delivery and installation schedules are not affected. Contractor's revision response time is not justification for equipment delivery or installation delay.

#### **1.7 PERMIT, TEST AND INSPECTION**

- A. Obtain and pay for permit, license, and inspection fee necessary to complete installation.
- B. Perform test required by Governing Authority in accordance with procedure described in ASME A17.2 Guide for Inspection of Elevators, Escalators, and Moving Walks in the presence of Authorized Representative.
- C. Supply personnel and equipment for test and final review by Consultant as required in Part 3.

#### **1.8 MAINTENANCE**

- A. Interim:
  1. When one or more elevators are near completion and ready for service the General Contractor may accept elevators for interim use and place in service prior to substantial completion of project.
  2. During this period General Contractor may pay a mutually agreed upon monthly amount per elevator for preventive maintenance. Indicate amount per unit per month with quotation.
  3. Temporary acceptance form must be acceptable to General Contractor and signed prior to use.



4. General Contractor must provide or pay for temporary hoistway and car enclosures; protect installed equipment and finishes; pay for and return elevators to elevator sub-contractor for all cleaning, repairs, and replacement of materials necessary to restore elevator to "as-new" condition prior to final acceptance.

B. Warranty Maintenance:

1. Provide preventive maintenance and 24-hour emergency callback service for one year commencing on date of final acceptance by Resident Engineer. Systematically examine, adjust, clean, and lubricate all equipment. Repair or replace defective parts using parts produced by the Contractor of installed equipment. Maintain elevator machine room, hoistway, and pit in clean condition.
2. Use competent personnel, acceptable to the Resident Engineer, supervised and employed by Contractor.
3. The warranty maintenance period specified in Item 1 above shall be extended one (1) month for each three (3) month period in which equipment related failures average more than .25 per unit per month.
4. Resident Engineer retains the option to delete cost of warranty maintenance from new equipment contract and remit twelve (12) equal installments directly to Contractor during period in which maintenance is being performed.

C. Preventive Maintenance:

1. Quote monthly cost for five year Preventive Maintenance Agreement commencing upon completion of warranty maintenance.
2. Use competent personnel, acceptable to the Resident Engineer, employed and supervised by Contractor.

**PART 2 PRODUCTS**

**2.1 SUMMARY**

- A. TWO (2) Passenger Elevator(s) and TWO (2) Service Elevator(s)

Number:	Car(s) PASSENGER 1-2 SERVICE 3-4
Capacity:	#1-#2 3000 # #3 5000 # #4 6500#
Class Loading:	Passenger Class A Service Class A

Contract Speed:	350 F.P.M
Roping:	1:1
Machine:	Geared
Machine Location:	1-2 Below Pit 3-4 Overhead Offset At TOP FLOOR ROOF
Operational Control:	Duplex Selective Collective Microprocessor-Based System
Motor Control:	AC Variable Voltage Variable Frequency Microprocessor-Based with Digital Closed-Loop Feedback
Power Characteristics:	480 Volts, 3 Phase, 60 Hertz
Stops:	Car(s) 1-2 3 Front 0 Rear Car(s) 3 5 Front 0 Rear Car(s) 4 5 Front 1 Rear
Openings:	Car(s) 1-2 3 Front 0 Rear Car(s) 3 5 Front 0 Rear Car(s) 4 5 Front 1 Rear
Floors Served:	Car(s) 1-2 G, 1-2 Front 0 Rear Car(s) 3 B, G, 1-2, ROOF Front 0 Rear Car(s) 4 B, G, 1-2, ROOF Front BRIDGE Rear
Travel:	Car(s) 1-2 35'-0" ± Car(s) 3-4 67'-0" ±
Platform Size:	Car(s) 1-2 7'-0" Wide X 5'-6" Deep Car(s) 3 6'-0" Wide X 10'-1½" Deep Car(s) 4 7'-0" Wide X 10'-6" Deep
Minimum Clear Inside Car:	Car(s) 1-2 7'-0" Wide X 5'-6" Deep Car(s) 3 5'-8" Wide X 8'-7½" Deep Car(s) 4 6'-8" Wide X 9'-0" Deep
Entrance Size:	Car(s) 1-2 3'-6" Wide X 7'-0" Deep Car(s) 3 4'-6" Wide X 7'-0" Deep Car(s) 4 5'-0" Wide X 7'-0" Deep

Entrance Type:	Car(s) 1-2 Single, Center Opening Car(s) 3 Two Speed Side Opening Car(s) 4 Single Speed Center Opening
Door Operation:	High Speed, Heavy-Duty, Door Operator, Minimum Opening Speed 2- 1/2 F.P.S.
Door Protection:	Infrared, Full Screen Device with Differential Timing, Nudging and Interrupted Beam Time
Safety:	Flexible Guide Clamp-Type B, Car
Guide Rails:	Planed Steel Tees
Buffers:	Oil
Car Enclosure:	As Detailed on Architectural Drawings  Steel Shell as Specified Plus, Refer to Section 09 06 00, Schedule For Finishes  8'-0" Clear Height Under Canopy, Car(s) ALL  Battery Powered Emergency Car Lighting. Provide Separate Constant Pressure Test Button in Car Service Compartment. Illuminate Portion Of Normal Car Lighting
Signal Fixtures:	LED Illumination Contractor's Vandal Resistant Assembly
Hall and Car Pushbutton Stations:	Single Hall Pushbutton Riser Car(s) 1-2 Single Car Operating Panel(s) Car(s) 3-4 Dual Car Operating Panel(s) FRONT AND REAR  Vandal Resistant Car and Hall Pushbuttons
Car Position Indicators:	Single Digital with Car Direction Arrows MOUNTED IN EACH CAR OPERATING PANEL

Hall Lanterns:	At All Floors with Volume Adjustable Electronic Chime or Tone. Sound Twice for Down Direction
Hall Car Position Indicator:	Car(s) 1-2 Digital Type with Car Direction Arrows at G Floor. Car(s) 3-4 Digital Type with Car Direction Arrows at G.
Communication System:	Self-Dialing, Vandal Resistant, "HELP" button, Two-Way Communication System with Recall, Tracking and Voiceless Communication
Additional Features, Car(s) 1-2-3-4:	Car and Counterweight Roller Guides  Car Top Inspection Station  Firefighters' Service, Phase I and II, including Alternate Floor Return  Emergency Power Transfer (Automatic to Main Floor) with Manual Override  Accessibility and Emergency Medical Services Signage  Stationary Car Return Panel(s) Arranged for Surface Applied Car Operating Panel(s)  Hoistway Access Switches Top and Bottom Floors  Hoistway Door Unlocking Device All Floors  Platform Isolation  Load-Weighing Device  Independent Service Feature  Priority Service, CODE BLUE, Car(s) 3-4  Card Reader Provisions, All Cars WIRING ONLY

CCTV Provisions, All Cars  
WIRING ONLY

Machine, Power Conversion Unit,  
and Controller Sound Isolation

Tamper Resistant Fasteners for All  
Fastenings Exposed to the Public

One Year Warranty Maintenance with  
24-Hour Call-Back Service

Sill Support Angles, CAR(S) 3-4

Signage Engraving Filled with  
Black Paint or Approved Etching  
Process

No Visible Company Name or Logo

Wiring Diagrams, Operating  
Instructions, and Parts Ordering  
Information

Monitoring System

System Diagnostic Means and  
Instructions

Non-Proprietary Control System and  
Diagnostics Provisions

## **2.2 MATERIALS**

### **A. Steel:**

1. Sheet Steel (Furniture Steel for Exposed Work): Stretcher-leveled, cold-rolled, commercial quality carbon steel, complying with ASTM A366, matte finish.
2. Sheet Steel (for Unexposed Work): Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A568/A568M-03.
3. Structural Steel Shapes and Plates: ASTM A36.

### **B. Stainless Steel: Type 302 or 304 complying with ASTM A240, with standard tempers and hardness required for fabrication, strength and durability. Apply mechanical finish on fabricated work in the locations shown or specified, Federal Standard and NAAMM nomenclature, with texture and reflectivity required to match Architect's sample. Protect with adhesive paper covering.**

1. No. 4 Satin: Directional polish finish. Graining directions as shown or, if not shown, in vertical dimension.

- C. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.
- D. Plastic Laminate: ASTM E84 Class A and NEMA LD3.1, Fire-Rated Grade (GP-50), Type 7, 0.050"  $\pm$  0.005" thick, color and texture as follows:
  - 1. Exposed Surfaces: Color and texture, Refer to Section 09 06 00 Schedule For Finishes.
  - 2. Concealed Surfaces: Contractor's standard color and finish. Refer to Section 09 06 00 Schedule For Finishes.
- E. Fire-Retardant Treated Particle Board Panels: Minimum 3/4" thick backup for natural finished wood and plastic laminate veneered panels, edged and faced as shown, provided with suitable anti-warp backing; meet ASTM E84 Class "I" rating with a flame-spread rating of 25 or less, registered with Local Authorities for elevator finish materials.
- F. Natural Finish Wood Veneer: Standard thickness, 1/40" thoroughly dried conforming to ASME/HPMA HP-1983, Premium Grade. Place veneer, tapeless spliced with grain running in direction shown, belt and polish sanded, book-matched. Species and finish designated and approved by Architect. Refer to Section 09 06 00 Schedule For Finishes.
- G. Paint: Clean exposed metal parts and assemblies of oil, grease, scale, and other foreign matter and factory paint one shop coat of standard rust-resistant primer. After erection, provide one finish coat of industrial enamel paint. Galvanized metal need not be painted.
- H. Prime Finish: Clean all metal surfaces receiving a baked enamel paint finish of oil, grease, and scale. Apply one coat of rust-resistant primer followed by a filler coat over uneven surfaces. Sand smooth and apply final coat of primer.
- I. Baked Enamel Finish: Prime finish per above. Unless specified "prime finish" only, apply and bake three (3) additional coats of enamel in the selected solid color. Refer to Section 09 06 00 Schedule For Finishes.

### **2.3 CAR PERFORMANCE**

- A. Car Speed:  $\pm$  3% of contract speed under any loading condition.
- B. Car Capacity: Safely lower, stop and hold 125% of rated load.
- C. Car Stopping Zone:  $\pm$  1/4" under any loading condition.
- D. Door Opening Time: Seconds from start of opening to fully open:
  - 1. Car(s) 1-2: 1.6-2.1 seconds.
  - 2. Car(s) 3: 2.7-3.2 seconds.
  - 3. Car(s) 4: 2.7-3.2 seconds

E. Door Closing Time: Seconds from start of closing to fully closed:

1. Car(s) 1-2: 2.4-2.9 seconds.
2. Car(s) 3: 5.0-5.5 seconds.
3. Car(s) 4: 5.6-6.2 seconds.

F. Car Floor-to-Floor Performance Time: Seconds from start of doors closing until doors are 3/4 open (1/2 open for side opening doors) and car level and stopped at next successive floor under any loading condition or travel direction (12'-0" typical floor height):

1. Car(s) 1-2: 9.0-9.5 seconds.
2. Car(s) 3: 13.0-13.5 seconds.
3. Car(s) 4: 13.5-14.0 seconds

G. Car Ride Quality:

1. Horizontal and vertical acceleration within car during all riding and door operating conditions. Not more than 20 mg peak to peak (adjacent peaks) in the 1 - 10 Hz range.
2. Acceleration and Deceleration: Smooth constant and not less than 3 feet/second<sup>2</sup> with an initial ramp between 0.5 and 0.75 second.
3. Sustained Jerk: Not less than 6 feet/second<sup>3</sup>.
4. Measurement Standards: Measure and evaluate ride quality consistent with ISO 18738, using low pass cutoff frequency of 10 Hz and A95 peak-to-peak average calculations.

H. Noise and Vibration Control

1. Airborne Noise: Measured noise level of elevator equipment and its operation shall not exceed 60 dBA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed. Limit noise level in the machine room relating to elevator equipment and its operation to no more than 80 dBA. All dBA readings to be taken 3'-0" off the floor and 3'-0" from the equipment using the "A" weighted scale.
2. Vibration Control: All elevator equipment provided under this contract, including power unit, controller, oil supply lines, and their support shall be mechanically isolated from the building structure and electrically isolated from the building power supply and to each other to minimize the possibility of objectionable noise and vibrations being transmitted to occupied areas of the building.

## **2.4 OPERATION**

A. Duplex Selective Collective Microprocessor-Based, Car(s) 1-2 and 3-4:

1. Operate cars without attendants from pushbuttons in cars and located at each floor. When cars are available, park one car at main floor ("home" car). Park other car where last used ("free" car).
2. Respond to car calls and hall calls above main floor using the "free" car. Once a car has started, respond to registered calls in the direction of travel and in the order the floors are reached.
3. Do not reverse car direction until all car calls have been answered, or until all hall calls ahead of the car and corresponding to the direction of car travel have been answered.
4. Slow cars and stop automatically at floors corresponding to registered calls in the order in which they are approached in either direction of travel. As slowdown is initiated for a hall call, automatically cancel hall call. Cancel car calls in the same manner. Hold car at arrival floor an adjustable time interval to allow passenger transfer.
5. Answer calls corresponding to direction in which car is traveling unless call in the opposite direction is the highest (or lowest) call registered.
6. When the free car is clearing calls, start home car to respond to:
  - a. A call registered on home car pushbuttons.
  - b. An up hall call registered below free car.
  - c. An up or a down call registered above free car while free car is traveling down.
  - d. A hall call when free car is delayed in its normal operation for a predetermined period.
7. When both cars are clearing calls, stop only one car in response to any registered hall call. Return the first car to clear its calls to main floor. Should last service required bring both cars to main floor, the first arriving car becomes the free car.
8. Illuminate appropriate pushbutton to indicate call registration. Extinguish light when call is answered.

B. Other Items:

1. Load Weighing: Provide means for weighing car passenger load. Control system to provide dispatching at main floor in advance of normal intervals when car fills to capacity. Provide hall call by-pass when the car is filled to preset percentage of rated capacity



- and traveling in down direction. Field adjustment range: 10% to 100%.
2. Independent Service: Provide controls for operation of each car from its pushbuttons only. Close doors by constant pressure on desired destination floor button or door close button. Open doors automatically upon arrival at selected floor.
- C. Firefighters' Service: Provide equipment and operation in accordance with code requirements.
- D. Automatic Car Stopping Zone: Stop car within 1/4" above or below the landing sill. Maintain stopping zone regardless of load in car, direction of travel, distance between landings, hoist rope slippage, or stretch.
- E. Motion Control: Microprocessor based AC, variable-voltage, variable frequency with digitally encoded closed-loop velocity feedback suitable for operation specified and capable of providing smooth, comfortable car acceleration, retardation, and dynamic braking. Limit the difference in car speed between full load and no load to not more than  $\pm 3\%$  of the contract speed.
- F. Priority Service: CODE BLUE - Provide feature as specified for Car(s) 3-4.
1. Feature shall be activated via CARD READER, mounted in hoistway entrance PUSH BUTTON PANEL at floors ALL. Activation of card reader switch at any floor shall cause the following operation of selected elevator(s). An adjacent small blue light jewel to illuminate at that floor and all other floors with a priority service keyed switch to indicate car(s) "CODE BLUE." Illuminate corresponding small blue light jewel in lobby control panel. Registered car call(s) for selected car shall be cancelled. A blue light with the engraved signage beneath "please exit car" at the top of the car operating panel shall pulsate indicating to riding passengers the car has been commandeered for priority service. Include audible annunciation verbiage as selected. A car traveling toward floor of activation shall express non-stop to that floor. A car traveling away from floor of activation shall stop at the next available floor, reverse without opening doors, and express non-stop to floor of activation.
2. Upon arrival of car at floor of activation, car shall open its door(s) and "park" for an adjustable time period of 60 - 90 seconds.

- Provide second card reader device adjacent to blue light in car operating panel for attendant operation of car under priority service feature. Upon activation, car "park time" shall be voided and car shall be under control of attendant. Registration of a destination floor, followed by the activation of the door close button, shall cause express non-stop travel to selected floor. Upon arrival at selected floor, car shall open its doors and remain at that floor until another floor is selected or elevator is placed on Independent s service via key activated switch in car panel or service cabinet. Failure to activate car independent keyswitch within preset time constraints of 60 - 90 seconds shall cause car to be automatically restored to normal service.
- G. Door Operation: Automatically open doors when car arrives at main floor. At expiration of normal dwell time, close doors.
- H. Emergency Lighting and Alarm: Car mounted battery unit with solid-state charger to operate alarm bell and car emergency lighting. Battery to be rechargeable with minimum 5-year life expectancy. Include required transformer. Provide constant pressure test button in service compartment of car operating panel. Provide lighting integral with portion of normal car lighting system.
- I. Emergency Power Operation: Upon loss of normal power, adequate Emergency power will be supplied via building electrical feeders to simultaneously start and run one car in each group at contract car speed and capacity.
1. Automatically return one car at a time, in each group, nonstop to designated floor, open doors for approximately 3.0 seconds, close doors, and park car. During return operation, car and hall call pushbuttons shall be rendered inoperative. As each car parks, system shall immediately select the next car until all cars in a group have returned to the designated floor. If a car fails to start or return within 30 seconds, system shall automatically select the next car in the group to automatically return.
  2. When all cars in a group have returned to the designated floor, one car in each group shall be designated for automatic operation. When a service demand exists for 30 seconds and designated car fails to start, next available car in the group shall be automatically selected for operation.

3. Provide separate group selection switch(es) in lobby control panel. Properly label light and switch per code.
  - a. Switch(es) shall be labeled "EMERGENCY POWER OVERRIDE" with positions marked "AUTO" and appropriate car numbers controlled by each respective switch. Key shall be keyed differently than key utilized for firefighters' Phase I and II key switch. Key shall be removable in "AUTO" position only.
  - b. Switch shall override automatic return and automatic selection functions, and cause the manually selected car to operate. Manual selection shall cause car to start and proceed to designated floor and open and close its doors before Emergency power is manually transferred to next selected car.
  - c. Provide "EMERGENCY POWER" indicator lights (one per car) in lobby control panel. Indicator light illuminates when corresponding car is selected, automatically or manually, to operate on Emergency power.
4. Successive Starting: When normal power is restored or there has been a power interruption, individual cars in each bank shall restart at five-second intervals.
- J. Card/Proximity Reader Security System: Provide provisions, WIRING ONLY FROM MACHINE ROOM TO MAIN CAR OPERATING PANEL, Car(s) ALL

## **2.5 MACHINE ROOM EQUIPMENT**

- A. Arrange equipment in spaces shown on drawings.
- B. Guarding of equipment shall be per OSHA and ASME Code.
  1. Both the cable drive/sheave area and the electric motor end of the drives need to be protected. (ASME A17.1 indicates that moving parts associated with elevator equipment must be guarded per OSHA) (29 CFR 1910.212(a)(1)).
- C. Geared Traction Hoist Machine:
  1. Single worm geared or helical geared traction type with AC induction or P.M.S.M. ACV3F motor, brake, gear, drive shaft, deflector sheave, and gear case mounted in proper alignment on an isolated bedplate. Provide bedplate blocking to elevate secondary or deflector sheave above machine room floor.
  2. Provide hoist machine mounted direct drive, digital, closed-loop velocity encoder.
  3. Provide hoist machine drip pans to collect lubricant seepage.

4. Provide machine bedplate mounted deflector sheave A-frame or supporting steel beams and fastenings to mount deflector sheaves to building structure. Provide minimum 16 gauge easily removable sound insulated sheet metal closures in hoistway wall opening around machine.
  5. Provide ladders and platforms with handrails and toeboards for overhead sheave access within the bounds of the machine room.
- D. Solid State Power Conversion and Regulation Unit: Provide solid-state, alternating current, variable voltage, variable frequency (ACV3F), I.G.B.T converter/inverter drives.
1. Design unit to limit current, suppress noise, and prevent transient voltage feedback into building power supply. Provide internal heat sink cooling fans for the power drive portion of the converter panels. Conform to IEEE standards 519-1992 for line harmonics and switching noise.
  2. Isolate unit to minimize noise and vibration transmission. Provide isolation transformers, filter networks, and choke inductors.
  3. Suppress solid-state converter noises, radio frequency interference, and eliminate regenerative transients induced into the mainline feeders or the building Emergency power generator.
  4. Supplemental direct-current power for the operation of hoist machine brake, door operator, dispatch processor, signal fixtures, etc., from separate static power supply.
  5. ACV3F Drives for gearless elevators shall be regenerative and utilize IGBT converter/inverter and dynamic braking during overhauling condition.
- E. Encoder: Direct drive, solid-state, digital type. Update car position at each floor and automatically restore after power loss.
- F. Controller: UL/CSA labeled.
1. Compartment: Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame. Completely enclose equipment with covers. Provide means to prevent overheating.
  2. Relay Design: Magnet operated with contacts of design and material to insure maximum conductivity, long life, and reliable operation without overheating or excessive wear. Provide wiping action and means to prevent sticking due to fusion. Contacts carrying high

inductive currents shall be provided with arc deflectors or suppressors.

3. Microprocessor-Related Hardware:

- a. Provide built-in noise suppression devices which provide a high level of noise immunity on all solid-state hardware and devices.
- b. Provide power supplies with noise suppression devices.
- c. Isolate inputs from external devices (such as pushbuttons) with opto-isolation modules.
- d. Design control circuits with one leg of power supply grounded.
- e. Safety circuits shall not be affected by accidental grounding of any part of the system.
- f. System shall automatically restart when power is restored.
- g. System memory shall be retained in the event of power failure or disturbance.
- h. Equipment shall be provided with Electro Magnetic Interference (EMI) shielding within FCC guidelines.

4. Wiring: CSA labeled copper for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.

5. Permanently mark components (relays, fuses, PC boards, etc.) with symbols shown on wiring diagrams.

6. Monitoring System Interface: Provide controller with serial data link through RJ45 Ethernet connection and install all devices necessary to monitor items outlined in Part 2. Elevator contractor responsible to connect monitoring system interface to machine room monitoring compartment and LAN. Wiring from the LAN to the machine room monitoring compartment by others. Controllers shall be Lift Net compatible.

7. Provide controller or machine mounted auxiliary, lockable "open," disconnect if mainline disconnect is not in sight of controller and/or machine.

G. Sleeves and Guards: Provide 2" steel angle guards around cable or duct slots through floor slabs or grating. Provide rope and smoke guards for sheaves, cables, and cable slots in machine room and secondary machinery levels.

H. Machine and Equipment Support Beams:

1. Provide structural steel beams required for direct support of and attachment to building structure of hoist machine, deflector sheaves, overhead sheaves, governor, and hoist rope dead-end hitch assemblies.
  2. Provide bearing plates, anchors, shelf angles, blocking, embedment, etc., for support and fastening of machine beams or equipment to the building structure.
  3. Isolate machine and overhead sheave beams to prevent noise and vibration transmission to building structure.
  4. Provide hold-down bolts for offset hoist machines located beside or under hoistway where concrete hold-down pad is provided.
  5. Provide ladders and platforms with handrails and toe boards for overhead sheave access within the confines of the machine room.
- I. Governor: Centrifugal-type, car driven machine room mounted with pull-through jaws and bi-directional shutdown switches. Provide required bracketing and supports for attachment to building structure.
- J. Emergency Brake: Provide means to prevent ascending car over-speed and unintended car movement per code.

## **2.6 HOISTWAY EQUIPMENT**

- A. Guide Rails: Planed steel T-sections for car and counterweight of suitable size and weight for the application, including brackets for attachment to building structure. Provide rail backing and intermediate counterweight tie brackets to meet code requirements. No additional structural points of rail attachment, other than those shown on the Contract Documents, will be provided.
- B. Buffers, Car and Counterweight: Oil type with blocking and support channels.
- C. Sheaves: Machined grooves and sealed bearings. Provide mounting means to machine beams, machine bedplate, car and counterweight structural members, or building structure.
- D. Counterweight: Steel frame with metal filler weights. Provide Type "B" safety device.
- E. Counterweight Guide Shoes: Spring dampened roller guide shoes.
- F. Counterweight Guard: Metal guard in pit. Where counterweight is provided between adjacent elevators, provide runway guard next to the adjacent elevator.

G. Governor Rope and Encoder Tape Tensioning Sheaves: Mount sheaves and support frame on pit floor or guide rail. Provide frame with guides or pivot point to enable free vertical movement and proper tension of rope and tape.

H. Hoist and Governor Ropes:

1. 8 x 25 Seale construction, traction steel type. Fasten with staggered length, adjustable, spring isolated wedge type shackles.
2. Governor rope to suit Contractor's specification.

I. Terminal Stopping: Provide normal and final devices. CARS 1-2 Provide emergency terminal speed limiting devices.

J. Electrical Wiring and Wiring Connections:

1. Conductors and Connections: Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control compartments, or junction boxes. Provide 10% spare conductors throughout. Run spare wires from car connection points to individual elevator controllers in the machine room. Provide four pair of spare shielded communication wires in addition to those required to connect specified items. Tag spares in machine room.
2. Conduit: Painted or galvanized steel conduit, EMT, or duct. Conduit size, 3/4" minimum. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.
3. Traveling Cables: Flame and moisture-resistant outer cover. Prevent traveling cable from rubbing or chafing against hoistway or equipment within hoistway. Provide from each car controller to car top, plus 3'-0" excess loop at both ends and additional wiring:
  - a. (1) 6 conductor 22 awg stranded shielded cable for card reader.
  - b. (1) Cat. 6 shielded twisted 4 pair cable for elevator phone.
  - c. (1) Cat. 6 shielded twisted 4 pair cable for future IP CCTV camera.
  - d. (1) Cat. 6 shielded twisted 4 pair cable for future IP wireless access device.
  - e. (1) RG 6 coax cable 23 awg solid conductor, Duofoil 95% braid shield coverage for CCTV analog.

- f. (1) 2 solid conductors, 16 awg with, overall foil shield 100% coverage 22 awg stranded drain wire for fire alarm smoke detector.
  - g. Provide two (2) pair 14 gauge wire for CCTV power.
- 4. Auxiliary Wiring: Connect fire alarm initiating devices, emergency two-way communication system, CCTV, card reader, intercom, and/or background music in each car controller in machine room.
- K. Entrance Equipment:
  - 1. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
  - 2. Door Tracks: Bar or formed, cold-drawn removable steel tracks with smooth roller contact surface.
  - 3. Door Interlocks: Operable without retiring cam. Paint interlock box flat black.
  - 4. Door Closers: Spring, spirator, or jamb/strut mounted counterweight type. Design and adjust to insure smooth, quiet mechanical close of doors.
  - 5. Hoistway Door Unlocking Device: Provide unlocking device with escutcheon in door panel at all floors, with finish to match adjacent surface.
  - 6. Hoistway Access Switches: Mount in wall b at top and bottom floor(s). Provide switch with faceplate.
- L. Floor Numbers: Stencil paint 4" high floor designations in contrasting color on inside face of hoistway doors or hoistway fascia in location visible from within car.

## **2.7 HOISTWAY ENTRANCES**

- A. Complete entrances bearing fire labels from a nationally recognized testing laboratory approved within the governing jurisdiction.
- B. Frames: 14 gauge hollow metal at all floors. Bolted and lapped head to jamb assembly at ALL floors. Provide Arabic floor designation/Braille plates, centered at 60" above finished floor, on both side jambs of all entrances. Provide plates at main egress landing with "Star" designation. For designated emergency car, provide "Star of Life" designation plates at height of 78" - 84" above finished floor on both side jambs at all floors. Braille indications shall be below Arabic floor designation. Provide cast floor designation/Braille plates as manufactured by SCS, Vision Mark, or Entrada.



- C. Door Panels: 16 gauge steel, sandwich construction without binder angles. Provide leading edges of center-opening doors with rubber astragals. Provide a minimum of two (2) gibs per panel, one at leading and one at trailing edge with gibs in the sill groove entire length of door travel. Construct door panels with interlocking, stiffening ribs.
- D. Sight Guards: 14 gauge, same material and finish as hoistway entrance door panels. Construct without sharp edges.
- E. Sills: Nickel silver.
- F. Sill Supports: Structural or formed steel designed to support door sill based upon car loading classification. Mount to eliminate need for grout under the sill. CARS 3-4 Provide 5" x 5" x 1/2" cold-rolled structural steel angle, extending full width of hoistway. Fasten to building structure at maximum 18" O.C.
- G. Fascia, Toe Guards and Hanger Covers: 14 gauge furniture steel with Contractor's standard finish. Provide full height fascia, toe guards, and hanger covers where rear entrances are not provided.
- H. Struts and Headers: Provide for vertical support of entrances and related material. Provide door open bumpers on entrances equipped with vertical struts.
- I. Finish of Frames and Doors:

Car(s)	Floor	Frames	Door Panels
1-2	ALL	STAINLESS STEEL	STAINLESS STEEL
3-4	ALL	STAINLESS STEEL	STAINLESS STEEL

## 2.8 CAR EQUIPMENT

- A. Frame: Welded or bolted, rolled or formed steel channel construction to meet load classification specified.
- B. Safety Device: Type "B," flexible guide clamp.
- C. Platform: Isolated type, constructed of steel, or steel and wood which is fireproofed on underside. Design and construct to accommodate load classification requirements. Provide Class "A" construction for passenger elevators, Class A construction for service elevator.
- D. Platform Apron: Minimum 14 gauge steel, reinforced and braced to car platform front and rear with black enamel.

- E. Guide Shoes: Roller type with three or more spring dampened, sound-deadening rollers per shoe. Maximum roller rotation speed, 350 r.p.m. up through contract car speed of 900 fpm.
- F. Finish Floor Covering:
1. Car(s) 1-2: Refer to Section 09 06 00 Schedule For Finishes
  2. Car(s) 3-4: Refer to Section 09 06 00 Schedule For Finishes
- G. Sills: One piece extrusion with extruded extension between car entrance columns to face of car front return. Extruded extension to match finish of sill.
1. Car(s) 1-2: nickel silver
  2. Car(s) 3-4: nickel silver
- H. Doors: Provide as specified for hoistway entrance doors.
- I. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
- J. Door Track: Bar or formed, cold-drawn removable steel track with smooth roller contact surface.
- K. Door Header: Construct of minimum 12 gauge steel, shape to provide stiffening flanges.
- L. Door Electrical Contact: Prohibit car operation unless car door is closed.
- M. Door Clutch: Heavy-duty clutch, linkage arms, drive blocks and pickup rollers or cams to provide positive, smooth, quiet door operation. Design clutch so car doors can be closed, while hoistway doors remain open.
- N. Restricted Opening Device: Provide car-door interlock per code to prevent opening of car door(s) outside unlocking zone.
- O. Door Operator: High speed, heavy-duty door operator capable of opening doors at no less than 2-1/2 f.p.s. Accomplish reversal in no more than 2-1/2" of door movement. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Provide a minimum of four (4) controller-activated motion profiles, per floor, per door, to maintain consistent, smooth, and quiet door operation at all floors, regardless of door weight or varying air pressure.
- P. Door Control Device:
1. Infrared Reopening Device: Black fully enclosed device with full screen infrared matrix or multiple beams extending vertically along

leading edge of each door panel to minimum height of 7'-0" above finished floor. Device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open.

2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0 - 25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.
3. Interrupted Beam Time: When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds. When beams are interrupted after the initial 3.0 second hold open time, reduce time doors remain open to an adjustable time of approximately 1.0 - 1.5 seconds after beams are reestablished.
4. Differential Door Time: Provide separately adjustable timers to vary time that doors remain open after stopping in response to calls.
  - a. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.
  - b. Hall Call: Hold open time adjustable between 5.0 and 8.0 seconds. Use hall call time when car responds to coincidental calls.

Q. Car Operating Panel:

1. CARS 1-2-3-4 One car operating panel(s) with faceplate(s), consisting of a metal box containing vandal resistant operating fixtures, mounted behind the car stationary front return panel(s)
2. Suitably identify floor buttons, alarm button, door open button, door close button, and emergency "HELP" button with SCS, Visionmark, or Entrada cast tactile symbols rear mounted. Configure plates per local building code accessibility standards including Braille. Locate operating controls no higher than 48" above the car floor; no lower than 35" for emergency "HELP" button and alarm button.
3. Provide minimum 3/4" diameter raised floor pushbuttons which illuminate to indicate call registration.

4. Provide alarm button to ring bell located on car top. Illuminate button when actuated.
5. Provide keyed stop switch at bottom of car operating panel in locked car service compartment. Mark device to indicate "run" and "stop" positions.
6. Provide "door open" button to stop and reopen doors or hold doors in open position.
7. Extended Door Hold Open Button: CARS 3-4 Provide button to extend normal door hold open period up to 30 seconds. Cancel extended time by registration of car call or actuation of door close button.
8. Provide "door close" button to activate door close cycle. Cycle shall not begin until normal door dwell time for a car or hall call has expired, except firefighters' operation.
9. Provide firefighters' Phase II key switch with engraved instructions filled red. Include light jewel, audible signal, and call cancel button.
10. Provide lockable service compartment with recessed flush door. Door material and finish shall match car return panel or car operating panel faceplate.
11. Include the following controls in lockable service cabinet with function and operating positions identified by permanent signage or engraved legend:
  - a. Inspection switch.
  - b. Light switch.
  - c. Three-position exhaust blower switch.
  - d. Independent service switch.
  - e. Constant pressure test button for battery pack emergency lighting.
  - f. 120-volt, AC, GFCI protected electrical convenience outlet.
  - g. Card reader override switch.
  - h. Switch to select either floor voice annunciation, floor passing tone, or chime.
12. Provide black paint filled (except as noted), engraved, or approved etched signage as follows with approved size and font:
  - a. Phase II firefighters' operating instructions on main operating panel above corresponding key-switch filled red.
  - b. Car number on main car operating panel.

- c. "Certificate of Inspection on File in Building Office" on main car operating panel.
- d. "No Smoking" on main car operating panel.
- e. Car capacity in pounds on main car operating panel.
- R. Car Top Control Station: Mount to provide safe access and utilization while standing in an upright position on car top.
- S. Work Light and Duplex Plug Receptacle: GFCI protected outlet at top and bottom of car. Include on/off switch and lamp guard. Provide additional GFCI protected outlet on car top for installation of car CCTV.
- T. Communication System:
  - 1. "HELP"," two-way communication instrument in car with automatic dialing, tracking and recall features, with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability with minimum two numbers.
    - a. "HELP" button or adjacent light jewel shall illuminate and flash when call is acknowledged. Button shall match car operating panel pushbutton design. Provide uppercase "HELP," "HELP ON THE WAY" engraved signage adjacent to button.
    - b. Provide "HELP" button tactile symbol, engraved signage, and Braille adjacent to button mounted integral with car front return panel.
  - 2. Provide two-way communication between car and machine room if required.

## **2.9 CAR ENCLOSURE**

- A. Car Enclosure Passenger Elevator 1-2: Provide complete as specified herein and detailed on architectural drawings. Provide the following features.
  - 1. Shell: Reinforced 14 gauge furniture steel formed panels with baked enamel interior finish as selected. Apply sound-deadening mastic to exterior.
  - 2. Canopy: Reinforced 12 gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.
  - 3. Front Return Panels and Integral Entrance Columns: Reinforced 14 gauge stainless steel satin finish. Swing entire unit on substantial pivot points (minimum 3) for service access to car

- operating panel(s). Locate pivot points to provide full swing of front return panel without interference with side wall finish or handrail. Secure in closed position with concealed three-point latch. Provide service compartment with recessed flush cover and cutouts for operating switches, etc.
4. Front Return Panels: Reinforced 14 gauge stainless steel satin finish with cutouts for car operating panel(s) and other equipment.
  5. Entrance Columns: Reinforced 14 gauge satin finish stainless steel.
  6. Transom: Reinforced 14 gauge satin finish stainless steel full width of enclosure.
  7. Car Door Panels: Reinforced minimum 16 gauge satin finish stainless steel. Same construction as hoistway door panels.
  8. Base: Stainless steel with concealed ventilation cutouts.
  9. Ventilation: Morrison Products, Inc. two-speed, SOE No. 06-01055, exhaust blower mounted to car canopy on isolated rubber grommets. Exhaust blower shall meet requirements of Item 2.03, H.
  10. Lighting: Provide fluorescent fixtures with wiring and hookup. Coordinate with emergency lighting requirements. Provide emergency lighting integral with portion of normal car lighting system.
  11. Suspended Ceiling: Refer to Section 09 06 00 Schedule For Finishes.
  12. Handrails: Minimum 1-1/4" diameter Special design. Refer to Section 09 06 00 Schedule For Finishes.
  13. Interior Wall Finishes: Refer to Section 09 06 00 Schedule For Finishes
- B. Car Enclosure Service Elevator 3-4: Provide complete as specified herein. Provide the following features.
1. Shell: Reinforced 14 gauge stainless steel formed panels as specified in Item 2.02. Apply sound deadening mastic to exterior.
  2. Canopy: Reinforced 12 gauge furniture steel formed panels with lockable hinged emergency exit. Interior finish white reflective baked enamel.
  3. Front and Rear Return Panels: Reinforced 14 gauge stainless steel, textured finish as specified in Part 2, Article "Materials".
  4. Entrance Columns and Transom: Reinforced 14 gauge stainless steel, No. 4 satin finish.
  5. Car Door Panels: Reinforced minimum 16 gauge stainless steel textured finish as specified in Item 2.02. Same construction as

- hoistway door panels. Architectural metal cladding shall wrap around leading and trailing edge of panel and return a minimum of 1/2" on rear side of leading edge of panels.
6. Ventilation: Morrison Products, Inc. two-speed exhaust blower model OE mounted to car canopy on isolating rubber grommets. Provide with a diffuser and grille. Exhaust blower shall meet requirements Part 2, Article "Car Performance".
  7. Lighting: Fluorescent fixture flush mounted in ceiling with protective diffuser and steel guard over fixtures on car top.
  8. Handrails/Guardrails: Two lines. Top handrail line minimum 1-1/4" diameter stainless steel tubular grab bar. Lower guardrail line 4" x 3/8" solid stainless steel flatstock bars mounted on both sides of the car. Locate bottom guardrail line at 8" above car floor and handrail line at 32" above the car floor. Bolt rails through car walls from back and mount on 1-1/2" deep solid round stainless steel standoff spacers no more than 18" O.C. Return handrail/guardrail ends to car walls.

#### **2.10 HALL CONTROL STATIONS**

- A. Pushbuttons: Provide ONE riser with flush mounted faceplates. Include pushbuttons for each direction of travel which illuminate to indicate call registration. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency situation as part of faceplate. Pushbutton design shall match car operating panel pushbuttons. Provide vandal resistant pushbutton and light assemblies.

#### **2.11 SIGNALS**

- A. Hall Lantern, All Cars: Provide at each entrance to indicate travel direction of arriving car. Locate as detailed on architectural drawings. Illuminate up or down LED lights and sound tone once for up and twice for down direction prior to car arrival at floor. Sound level shall be adjustable from 20 - 80 dBA measured at 5'-0" in front of hall control station and 3'-0" off floor. Illuminate light until the car doors start to close. Provide advanced hall lantern notification to comply with ADA hall call notification time. Car direction lenses shall be with inscribed direction shaped arrows with faceplates. Lenses shall be minimum 2-1/2" in their smallest dimension.

B. Car Position Indicator: CARS 1-2 Alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 1/2" high to indicate floor served and direction of car travel. Locate fixture in each car operating panel. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel.

C. Car Position Indicator: CARS 3-4

1. CE Electronics, Elite P1 Microcomm, 10 inch, active matrix color TFT type display in the main car stations. Display elevator position, direction of travel, and up to eight (8) priority messages. The system shall also be capable of displaying floor-based messages as well as scheduled messages in either text or graphic formats. The display shall also be capable of time, date, and temperature. The upper part of the screen shall be reserved for car position and direction which shall be at all times. All messages shall be displayed on the lower part of the screen with space for four (4) lines of approximately 18 characters per line; only one message shall be displayed at a time.
2. The displays shall have a priority override sequence available. A duration shall be assigned for each of the floor-based messages so that they are displayed one after another for the time intervals specified. When the car has committed to stop at a floor a directory message shall be displayed overriding any floor -based message. While the car doors are open the directory message shall continue to be displayed and the triangle indicating the car's direction shall move up and down. When the car doors close the directory message shall disappear. Elevator display information shall be kept updated via a serial link. System updates shall use windows-based software to be provided to Owner and shall be able to be programmed via a standard RS485 link. The display shall have the following abilities:
  - a. User customized display layout
  - b. User choice of background colors
  - c. Choice of font style
  - d. Choice of different arrow styles
  - e. Choice of factory and customer designed graphic files
  - f. Remote display updates by choice of one or more displays



3. In addition to position and direction, the display shall interface with the elevator control system to provide system-based messages for the following conditions at a minimum:
  - a. Firefighters' Service, Phase I
  - b. Firefighters' Service, Phase II
  - c. Independent Service
  - d. Elevator Recall Activated
- D. Hall Position Indicator, ALL Car(s): Alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 1/2" high to indicate floor served and direction of car travel. Mount integral with hall lanterns at G (Ground) floor.
- E. Faceplate Material and Finish: Stainless steel Satin finish all fixtures.
- F. Floor Passing Tone: Provide an audible tone of no less than 20 decibels and frequency of no higher than 1500 Hz, to sound as the car passes or stops at a floor served.
- G. Voice Synthesizer: Provide electronic device with easily reprogrammable message and female voice to announce car direction, floor, emergency exiting instructions, etc.

#### **2.12 GROUP CONTROL AND DISPLAY PANEL**

- A. Firefighters' Key Box: Flush-mounted box with lockable hinged cover. Engrave instructions for use on cover per Local Fire Authority requirements.
- B. Machine Room Display Unit: Provide groups of elevators with a machine room color SVGA monitor. As a minimum, SVGA monitor shall display the following functions:
  1. Car operating in normal/Emergency power.
  2. Car position and direction of travel.
  3. Car calls.
  4. Hall calls.
  5. Operating mode.
  6. Door status.
  7. Delayed car.
  8. Load weighing and by-pass.
  9. Car in/out of service.
  10. Card reader override. Individual car on/off provisions.

C. Provide additional visual display and monitoring provisions specified in Items 2.12, C above.

1. Provide wiring from ROB elevator machine rooms to the UD Building 1 Maintenance Supervisor's Room BW104A for remote monitoring of elevator performance/status. Provide necessary equipment/software to view the ROB elevator performance/status on the existing elevator monitoring computer terminal located in UD Building 1 Room BW104A. No adjustments to elevators can be made from the remote monitoring system

### **PART 3 EXECUTION**

#### **3.1 SITE CONDITION INSPECTION**

- A. Prior to beginning installation of equipment examine hoistway and machine room areas. Verify no irregularities exist which affect execution of work specified.
- B. Do not proceed with installation until work in place conforms to project requirements.

#### **3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver material in Contractor's original unopened protective packaging.
- B. Store material in original protective packaging. Prevent soiling, physical damage, or moisture damage.
- C. Protect equipment and exposed finishes from damage and stains during transportation, erection, and construction.

#### **3.3 INSTALLATION**

- A. Install all equipment in accordance with Contractor's instructions, referenced codes, specification, and approved submittals.
- B. Install machine room equipment with clearances in accordance with referenced codes and specification.
- C. Install all equipment so it may be easily removed for maintenance and repair.
- D. Install all equipment for ease of maintenance.
- E. Install all equipment to afford maximum accessibility, safety, and continuity of operation.
- F. Remove oil, grease, scale, and other foreign matter from the following equipment and apply one coat of field-applied machinery enamel.
  1. All exposed equipment and metal work installed as part of this work which does not have architectural finish.

2. Machine room equipment, hoistway equipment including guide rails, guide rail brackets, and pit equipment.
3. Neatly touch up damaged factory-painted surfaces with original paint color. Protect machine-finish surfaces against corrosion.

### **3.4 FIELD QUALITY CONTROL**

- A. Work at jobsite will be checked during course of installation. Full cooperation with reviewing personnel is mandatory. Accomplish corrective work required prior to performing further installation.
- B. Have Code Authority acceptance inspection performed and complete corrective work.

### **3.5 ADJUSTMENTS**

- A. Install rails plumb and align vertically with tolerance of 1/16" in 100'-0". Secure joints without gaps and file any irregularities to a smooth surface.
- B. Static balance car to equalize pressure of guide shoes on guide rails.
- C. Lubricate all equipment in accordance with Contractor's instructions.
- D. Adjust motors, power conversion units, brakes, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks, and safety devices to achieve required performance levels.

### **3.6 CLEANUP**

- A. Keep work areas orderly and free from debris during progress of project. Remove packaging materials on a daily basis.
- B. Remove all loose materials and filings resulting from work.
- C. Clean machine room equipment and floor.
- D. Clean hoistways, car, car enclosure, entrances, operating and signal fixtures.

### **3.7 ACCEPTANCE REVIEW AND TESTS**

- A. Review procedure shall apply for individual elevators, portions of groups of elevators and completed groups of elevators accepted on an interim basis or elevators and groups of elevators completed, accepted, and placed into operation.
- B. Contractor shall perform review and evaluation of all aspects of its work prior to requesting Consultant's final review. Work shall be considered ready for Resident Engineer and Consultant's final contract compliance review when all Contractor's tests are complete and all elements of work or a designated portion thereof are in place and

elevator or groups of elevators are deemed ready for service as intended.

- C. Furnish labor, materials, and equipment necessary for Resident Engineer and Consultant's review. Notify Consultant a minimum of five (5) working days in advance when ready for final review of elevator or group.
- D. Consultant's written list of observed deficiencies of materials, equipment and operating systems will be submitted to Contractor for corrective action. Consultant's review shall include as a minimum:
  - 1. Workmanship and equipment compliance with Contract Documents.
  - 2. Contract speed, capacity, floor-to-floor, and door performance comply with Contract Documents.
  - 3. Performance of following is satisfactory:
    - a. Starting, accelerating, running
    - b. Decelerating and stopping accuracy
    - c. Door operation and closing force
    - d. Equipment noise levels
    - e. Signal fixture utility
    - f. Overall ride quality
    - g. Performance of door control devices
    - h. Operations of emergency two-way communication device
    - i. Operations of firefighters' service
    - j. Operations of special security features and floor lock-off provisions
    - k. Operations of emergency brake device
  - 4. Test Results:
    - a. In all test conditions obtain specified contract speed, performance times, stopping accuracy without re-leveling, and ride quality to satisfaction of Purchaser and Consultant. Tests shall be conducted under both no load and full load condition.
    - b. Temperature rise in motor windings limited to 50° Celsius above ambient. A full-capacity one (1) hour running test, stopping at each floor for ten (10) seconds in up and down directions, may be required.
- E. Performance Guarantee: Should Consultant's or Resident Engineer's review identify defects, poor workmanship, variance, or noncompliance with requirements of specified codes and/or ordinances, or variance or

noncompliance with the requirements of Contract Documents, Contractor shall complete corrective work in an expedient manner to satisfaction of Purchaser and Consultant at no cost as follows:

1. Replace equipment that does not meet code or Contract Document requirements.
2. Perform work and furnish labor, materials, and equipment necessary to meet specified operation and performance.
3. Perform retesting required by Governing Code Authority, Purchaser, and Consultant.

F. A follow-up final contract compliance review shall be performed by Consultant after notification by Contractor that all deficiencies have been corrected. Provide Consultant with copies of the initial deficiency report marked to indicate items which Resident Engineer and Contractor considers complete. If additional reviews are required due to Contractor's gross non-compliance with initial and follow-up deficiency reports, consultant shall bill Contractor at normal billing rates plus expenses, and Contractor acknowledges it will pay for additional compliance reviews.

### **3.8 GOVERNMENT'S INFORMATION**

A. Non-Proprietary Equipment Design: Provide three sets of neatly bound written information necessary for proper maintenance and adjustment for equipment of within 30 days following final acceptance. Final retention will be withheld until data is received by The Government and reviewed by Consultant. Include the following as minimums:

1. Straight-line wiring diagrams of "as-installed" elevator circuits with index of location and function of components. Provide one set reproducible master. Mount one set wiring diagrams on panels, racked, or similarly protected in elevator machine room. Provide remaining set rolled and in a protective drawing tube. Maintain all drawing sets with addition of all subsequent changes. These diagrams are the Government's property. A legend sheet shall be furnished with each set of drawings to provide the following information:
  - a. Name and symbol of each relay, switch, or other apparatus.
  - b. Location on drawings, drawing sheet number and area, and location of all contacts.
  - c. Location of apparatus, whether on controller or on car.

2. Printed instructions explaining all operating features.
3. Complete software documentation for all installed equipment.
4. Machine room and hoistway drawings "as-installed".
5. Complete "as-installed" fixture drawings.
6. Complete "as-installed" cabs and interior drawings.
7. Lubrication instructions including recommended grade of lubricants.
8. Parts catalogs listing all replaceable parts including Contractor's identifying numbers and ordering instructions.
9. Four sets of keys for all switches and control features properly tagged and marked.
10. Diagnostic test devices together with all supporting information necessary for interpretation of test data and troubleshooting of elevator system and performance of routine safety tests.
11. The elevator installation shall be a design that can be maintained by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment Contractor.
  - a. Provide on site capability to diagnose faults to the level of individual circuit boards and individual discrete components for the solid state elevator controller.
  - b. Provide a separate detachable device as required to the Government as part of this installation if the equipment for fault diagnosis is not completely self-contained within the controller. Such device shall be in possession of and become property of the Purchaser.
  - c. Installed equipment not meeting this requirement shall be removed and replaced with conforming equipment at no cost to the Government.
12. Provide upgrades and/or revisions of software during the progress of the work, warranty period, and the term of the ongoing maintenance agreement between the Government and Contractor.

- - -END OF SECTION- - -